

Exhibit F1

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**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

**IN RE GOOGLE PLAY STORE
ANTITRUST LITIGATION**

THIS DOCUMENT RELATES TO:

*In re Google Play Consumer Antitrust
Litigation*, Case No. 3:20-cv-05761-JD

State of Utah et al. v. Google LLC et al.,
Case No. 3:21-cv-05227-JD

Case No. 3:21-md-02981-JD

**CONSUMER AND STATE PLAINTIFFS'
OPPOSITION TO DEFENDANTS'
MOTION TO EXCLUDE MERITS
OPINIONS OF DR. HAL J. SINGER**

Judge: Hon. James Donato

Table of Contents

| | | |
|----|--|----|
| 1 | | |
| 2 | Introduction..... | 1 |
| 3 | Background..... | 1 |
| 4 | Argument | 5 |
| 5 | I. Dr. Singer’s Pass-Through Analysis Is Reliable..... | 5 |
| 6 | A. Logit Reliably Models Demand for Each of Google’s App Categories. | 6 |
| 7 | B. Dr. Singer Accounted for Focal Point Pricing..... | 9 |
| 8 | C. Dr. Singer Accounted for Developers’ Costs | 10 |
| 9 | D. Dr. Singer Used Extensive Available Data..... | 11 |
| 10 | II. Dr. Singer’s Consumer Subsidy Overcharge Models Are Admissible and Reliable..... | 12 |
| 11 | A. Dr. Singer’s Discount Model Is Reliable..... | 13 |
| 12 | B. Dr. Singer’s Amazon Model Is Reliable..... | 14 |
| 13 | Conclusion | 15 |

Table of Authorities

Cases

| | |
|---|--------|
| <i>Comcast Corp. v. Behrend</i> , 569 U.S. 27 (2013)..... | 12 |
| <i>Elosu v. Middlefork Ranch Inc.</i> , 26 F.4th 1017 (9th Cir. 2022)..... | 12 |
| <i>In re Apple iPhone Antitrust Litig.</i> , No. 11-cv-6714-YGR, 2022 WL 1284104 (N.D. Cal. Mar. 29, 2022)..... | 10, 15 |
| <i>In re Google Play Store Antitrust Litig.</i> , No. 20-cv-5761, 2022 WL 17252587 (N.D. Cal. Nov. 28, 2022) | 1 |
| <i>In re Mushroom Direct Purchaser Antitrust Litig.</i> , No. 06-0620, 2015 WL 5767415 (E.D. Pa. July 29, 2015)..... | 14 |
| <i>Krueger v. Wyeth, Inc.</i> , 310 F.R.D. 468 (S.D. Cal. 2015)..... | 13 |
| <i>Milan v. Clif Bar & Co.</i> , 340 F.R.D. 591 (N.D. Cal. 2021) | 5 |
| <i>Sidibe v. Sutter Health</i> , 333 F.R.D. 463 (N.D. Cal. 2019) | 11 |
| <i>Victorino v. FCA US LLC</i> , No. 16-cv-1617-GPC, 2018 WL 2767300 (S.D. Cal. June 7, 2018) | 14 |

Introduction

Dr. Singer’s merits expert report outlines the methodology he will use to demonstrate that Google’s conduct has harmed U.S. consumers. The market for Android App Distribution is two-sided, connecting developers who sell apps to consumers who buy them through Google Play Billing. Dr. Singer’s methodology recognizes this economic reality and models the overcharges consumers have paid through higher prices on both sides of the market. One model shows that Google’s supracompetitive take rate it charges developers has resulted in an overcharge in the form of higher app and in-app-content prices for consumers. Another shows that the lack of competition has reduced the direct consumer discounts that Google gives users, also resulting in an overcharge to the consumer side of the platform. Depending on the form competition takes in the but-for world, Dr. Singer models consumer impact and damages based on price impacts on either or both sides of the market.

Unlike at class certification, Google does not argue that any of Dr. Singer’s models—the Rochet-Tirole and Landes-Posner models used to calculate but-for take rates and consumer subsidies or the logit model used to calculate pass-through—are not generally accepted in economics. Instead, Google focuses its arguments solely on fit and on assumptions Dr. Singer made. Like at class certification, Google resorts to mischaracterizing the record and Dr. Singer’s testimony. Dr. Singer’s methods reliably demonstrate consumer impact and damages; Google’s critiques should be addressed on cross examination before a jury. Accordingly, just as this Court did at class certification, it should deny Google’s motion.

Background

Dr. Singer has again authored a comprehensive expert report and reply report disclosing the opinions he will offer at trial, including the same opinions regarding class-wide damages that were the subject of Google’s *Daubert* motion at class certification, which this Court denied. Ex. 1 (Singer Rpt.); Ex. 2 (Singer Reply); Dkt. 252; Dkt. 271; *In re Google Play Store Antitrust Litig.*, No. 20-cv-5761, 2022 WL 17252587 (N.D. Cal. Nov. 28, 2022). Google focuses solely on Dr. Singer’s analysis of antitrust impact and damages, and does not challenge his qualifications or any other opinion. Dkt. 487 (“Mot.”). For the merits, Google has retained a new expert, Dr. Gregory Leonard, whose analysis, Ex. 3 (Leonard Rpt.), repeats many of the mistakes made by Google’s class certification expert.

Google Play is a two-sided market, with app developers on one side and consumers on the other.

Understanding the need to analyze both sides of the market, Dr. Singer models how Google’s anticompetitive conduct raised prices on both sides of the market, resulting in substantial overcharges.

Overcharge from Google’s Take Rate. On one side of the market, Google extracts a supra-competitive take rate from the prices consumers pay for developers’ apps, resulting in higher prices. Ex. 1 (Singer Rpt.) ¶ 305. Dr. Singer uses two well-established models—the Rochet-Tirole Model (for the two-sided Android App Distribution Market) and the Landes-Posner Model (for the one-sided In-App Aftermarket)—to calculate the take rate Google would charge in the but-for world. *Id.* ¶¶ 305 (Table 6), 330 (Table 8). Google does not take issue with these models except to the extent pass-through is used as an input. After calculating the competitive take rate, Dr. Singer ran extensive regressions on the full available transactional data to determine the demand curves faced by developers. He then applied the resulting pass-through formula to the transactional data to calculate the portion of Google’s overcharge borne by consumers in the form of higher prices. *Id.* ¶¶ 335-63.

Overcharge from Consumer Discounts. On the other side of the market, Google currently sets a modestly negative price, by discounting consumer prices directly through a reward program called Play Points and through other discounts. *Id.* ¶¶ 371-73. In the but-for world, consumer prices would be lower because Google would offer more competitive consumer discounts to make the Play Store more attractive to consumers. *Id.* ¶¶ 374-83. Dr. Singer models this overcharge in two ways. First, he uses the same Rochet-Tirole Model, but calibrates it to solve for the but-for price on the consumer side of the market. *Id.* ¶¶ 384-388 & Table 16. This model includes a built-in incumbency advantage for Google, resulting in net discounts of [REDACTED] % in the but-for world. *Id.* ¶¶ 387, 420. Dr. Singer also uses real-world consumer discounts in Amazon’s Android app store as a benchmark. *Id.* ¶¶ 417-20. [REDACTED]

[REDACTED] *Id.* Tables 20-21. Google claims that “Dr. Singer could not say which of these widely divergent estimates was more reliable.” Mot. at 5. Not so. Put together, Dr. Singer’s discount model and Amazon model provide a range of possible overcharges in the but-for world, with the more conservative discount model assuming a “durable incumbency advantage” in the but-for world, and the Amazon model showing Google fully matching its competitor’s discounts. Ex. 1 (Singer Rpt.) ¶ 420.

Overcharge on Both Dimensions. Google accuses Dr. Singer of offering “a smorgasbord of theories that are in tension with one another,” Mot. at 1, but that misunderstands how Dr. Singer’s models work together. In the but-for world, competitors may enter by competing on the take rate, by directly discounting prices to entice consumers to their stores, or by a mixture of both approaches. Ex. 1 (Singer Rpt.) ¶ 371. Dr. Singer provides models for each of those three forms of competition given that each of these approaches has been attempted in the actual world. Amazon has competed by offering significant consumer discounts, focusing its competition mostly on the consumer side of the platform. *Id.* ¶¶ 417-20. Aptoide, an app store based in Europe, has offered lower take rates seeking to attract developers. *Id.* ¶ 311. The ONE Store in Korea has competed in both ways, offering lower take rates and consumer discounts. *Id.* ¶ 308. Dr. Singer models the but-for world under each of those outcomes and allows the jury to calculate damages based on its factual findings.

Use of Google Data. Google spends much of its brief deriding Dr. Singer for not directly measuring changes in app prices after Google’s limited take rate reductions. Dr. Singer did not employ the “natural experiments” Google suggests because there was not enough variation in the data. Over 90% of transactions from 2016 to 2021 took place at the 30% take rate. Ex. 4 (Hot Tub Tr.) at 60:1-4; Ex. 5 (Singer Class Reply) Fig. 1. And although Google has lowered its take rate for some transactions, Google’s anticompetitive restrictions remain in place, dampening developers’ ability and incentives to lower prices. For these reasons, the data lacks “the necessary basis for synthetic control analysis: a clean control group ... from which the Challenged Conduct is absent.” Ex. 2 (Singer Reply) ¶ 39. Because Google’s challenged conduct has been in place for the entire existence of the market, “there is no pre-existing or post-conduct time period to use for purposes of standard regression analysis.” Ex. 1 (Singer Rpt.) ¶ 280. Dr. Singer reasonably rejected the approach Google suggested he should have taken.

Moreover, Google’s criticism ignores that Dr. Singer made extensive use of Google’s transactional data, both to determine the demand curve faced by developers and to directly measure pass-through of *ad valorem* (i.e., percentage) costs. To determine the demand curve faced by developers, he ran regressions across every single transaction in the database across the entire damages period, ranging from August 16, 2016 to May 31, 2022. Ex. 1 (Singer Rpt.) ¶ 353. Dr. Singer also used corroborative empirical evidence of pass-through by showing that higher tax rates—which like Google’s take rate, are

an *ad valorem* cost—“are systematically passed on by developers to consumers in the form of higher prices” across Google’s voluminous transactional data. Ex. 2 (Singer Reply) ¶ 8.

Dr. Leonard’s Flawed Experiments. Google claims Dr. Leonard’s “multiple analyses of six different data sets of IAPs at the SKU level, covering hundreds of products” shows little pass-through in the real world, Mot. at 4, but ignores the significant flaws with those experiments. Dr. Leonard conducted two types of analyses—a simple before and after price comparison for six overlapping sets of 100 SKUs, and a “synthetic control” regression—on prices after Google reduced the take rate to 15% on the first \$1 million in each developer’s revenue in mid-2021. Ex. 3 (Leonard Rpt.) ¶¶ 36-54. While Dr. Singer used almost six years of available data, Dr. Leonard analyzed less than a year’s worth of data after the take rate declined (July 2021 to May 2022). Ex. 2 (Singer Reply) ¶ 22; Ex. 3 (Leonard Rpt.) ¶¶ 36-54.

Both of Dr. Leonard’s analyses relied on the same flawed SKU-level methodology of Google’s class certification expert. Ex. 2 (Singer Reply) ¶ 5; Ex. 5 (Singer Class Reply) ¶¶ 123-133. That methodology’s sole focus on individual SKUs is wholly unreliable because it misses the forest for the trees, ignoring the actual products developers sell and the multiple ways developers can change prices. *Id.*¹ Dr. Leonard’s analyses of a narrow time period and transient reductions in take rate further compound these issues, make his conclusions especially susceptible to price stickiness concerns, and do not allow time for developers to internalize Google’s limited take rate reductions. Ex. 2 (Singer Reply) ¶ 23. And as described below, both of his analyses also suffer from significant additional flaws.

First, Dr. Leonard analyzed “six different data sets,” Mot. at 4, that each contained only 100 SKUs. Ex. 3 (Leonard Rpt.) ¶¶ 36-43. These six sets of 100 SKUs—3 sets of in-app purchases and 3 sets of initial app purchases—overlap significantly, meaning that Dr. Leonard analyzed fewer than 600 SKUs (not products) in total. *See* Ex. 6 (Leonard Dep.) at 37:4-19. Dr. Leonard did not know how many SKUs were in the full data set and acknowledged that some apps individually contain hundreds of SKUs for in-app purchases. *Id.* at 39:13-15, 41:15-18. In total, the SKUs Dr. Leonard analyzed represented “approximately [REDACTED] percent of aggregate purchases” by Consumers over the period he studied. Ex. 2

¹ Dr. Leonard claims to have ruled out some of these issues, Ex. 3 (Leonard Rpt.) ¶ 43 n.30, but he failed to take basic steps to analyze how developers use SKUs. For the SKUs he analyzed, he did not determine whether other SKUs in the same app changed their price, and he did not even know what products the SKUs he analyzed represented. Ex. 6 (Leonard Dep.) at 47:11-16, 48:9-49:24.

(Singer Reply) ¶ 21. Because the take-rate reduction Dr. Leonard analyzed applies only to the first million in developer revenue, many of the SKUs he analyzed experienced only fleeting take rate reductions, sometimes for less than a month. Ex. 3 (Leonard Rpt.) ¶ 41 & Fig. 3. Moreover, Dr. Leonard admitted that he does not know whether the SKUs he analyzed are “representative of all apps that received a service fee reduction” and performed no analysis to determine if they were. Ex. 6 (Leonard Dep.) at 59:19-61:4.² Nor did Dr. Leonard control for whether any factors aside from the service fee reduction affected the price of the SKUs he analyzed. *Id.* at 47:17-48:2. Dr. Leonard also failed to adjust for inflation, even though the time period featured significant inflation. Ex. 2 (Singer Reply) Figs. 1-3.³

Second, Dr. Leonard ran a “synthetic control” regression, comparing developers whose take rate remained the same (control group) to those who received a reduction in July 2021 (treatment group). Ex. 3 (Leonard Rpt.) ¶¶ 47-54. His treatment group included only *one percent* of transactions over that already limited period. Ex. 2 (Singer Reply) ¶¶ 35, 38. The treatment group contained developers making significantly less revenue (averaging \$█████ per year) than those in his control group (averaging \$█████ per year). *Id.* ¶ 37. Due to these and other issues, Dr. Leonard’s analysis produced nonsensical results. His analysis was unable to determine the sign, let alone the magnitude, of the pass-through rate, so he arbitrarily used the extreme upper bound of the 95% confidence interval from his regression analysis to calculate his 3% pass-through rate. *Id.* ¶ 39; Ex. 3 (Leonard Rpt.) ¶ 51.

Argument

I. Dr. Singer’s Pass-Through Analysis Is Reliable

Dr. Singer’s pass-through analysis, which is grounded in extensive empirical work, is reliable. Google now appears to concede that the “logit model is sometimes used for other kinds of antitrust analyses.” Mot. at 6. As such, Google does not argue that Dr. Singer’s method is not “generally accepted,” which is a “key factor” in the *Daubert* analysis. *See Milan v. Clif Bar & Co.*, 340 F.R.D. 591,

² Dr. Leonard declined to analyze any subscription SKUs except for Tinder in his “real-world analysis” because “[i]t’s really just that its subscriptions are a little bit messier because there was the January 2018 change, so that’s the real reason.” Ex. 6 (Leonard Dep.) at 61:21-62:14.

³ Dr. Leonard claims to rule out inflation because he found “no statistically significant relationship” between inflation and Android app prices. Ex. 3 (Leonard Rpt.) ¶ 38 n.14. But Dr. Leonard’s finding of no relationship is equally consistent with pass-through of savings in real dollar values as inflation increased, just as Dr. Singer’s analysis showed. Ex. 7 (Singer Merits Dep.) 133:12-18.

601 (N.D. Cal. 2021); *see also* Ex. 1 (Singer Rpt.) ¶ 348 n.809. Google instead focuses its arguments on fit, arguing that “Plaintiffs have the burden to show that Dr. Singer’s formula in *this case* is reliable.” Mot. at 6. As an initial matter, Dr. Singer’s application of logit is directly analogous to the merger context—the objective is to map a change in costs onto a change in price. *See* Ex. 4 (Hot Tub Tr.) at 61:18-20. More specifically, none of the factors Google identifies undermine the fit of Dr. Singer’s methods to this case, or the logit model’s fit to Google’s transactional data.

A. Logit Reliably Models Demand for Each of Google’s App Categories.

Google argues that “[i]f logit does not reliably model user demand, then Dr. Singer’s formula derived from logit is not reliable.” Mot. at 6. Neither Google nor its experts argue that another demand curve fits the facts of this case better.⁴ Instead, Google focuses solely on whether the logit demand system’s property of proportional substitution (also known as “independence of irrelevant alternatives” or “IIA”) is satisfied. Proportional substitution means that when prices for one product increase, consumers switch to substitutes in proportion to their relative shares. The facts support the use of proportional substitution, and logit models can reliably measure pass-through even if proportional substitution does not perfectly hold.

First, Dr. Singer has demonstrated that logit does reliably model user demand, and Google does not present any reliable evidence showing otherwise. Dr. Singer’s regressions show that logit “explain[s] over 95 percent of the variation in consumer demand in the voluminous Google transaction data.” Ex. 2 (Singer Reply) ¶ 7. For each of the Play Store’s categories, Dr. Singer finds a negative and highly statistically significant relationship between price and share within that category. Ex. 1 (Singer Rpt.) ¶ 354. Dr. Singer has also tested logit against alternative models. Ex. 2 (Singer Reply) ¶ 51 & Appendix 3; Ex. 7 (Singer Merits Dep.) 114:18-116:5. Dr. Singer’s use of standard econometric methods to confirm logit’s fit is “standard practice in empirical antitrust work,” wherein “the form of the demand curve is

⁴ Google’s only passing effort to suggest another demand model would work is by noting that Dr. McFadden used log-linear demand rather than logit demand in the Apple litigation. Mot. at 8 n.3. But the fact that Dr. McFadden used a different model—while using the same app categories to calibrate his model—is of no matter. Dr. McFadden concedes that his log-linear equations are meant only to “approximate consumer demand” (in the market for iOS apps, not Android apps) and there is no indication that Dr. McFadden tested (let alone rejected) logit demand. *In re Apple iPhone Antitrust Litig.*, No. 4:11-cv-6714-YGR (N.D. Cal.), Dkt. 643-11 at 151, Appendix D, ¶ 7.

assessed based on ‘how well the model fits the observable data.’” Ex. 2 (Singer Reply) ¶ 7 (quoting Ex. 8 (Luke Froeb et al., *Economics at the Antitrust Division: 2017–2018*, 53 REVIEW OF INDUSTRIAL ORGANIZATION 637, 640 (2018))).

“[T]he logit model makes a very specific prediction about the relationship between an app’s share within its category and its price,” and Dr. Singer’s regressions confirmed that relationship. Ex. 4 (Hot Tub Tr.) at 81:21-82:22. As Dr. Singer testified, “once you know that the model fits and is the best demand system for the data, you can infer that users are moving around the category in proportion to the market share.” Ex. 7 (Singer Merits Dep.) 188:10-15. Google seeks to cast doubt on Dr. Singer’s empirical analysis—even though it has not moved to exclude it—by truncating Dr. Singer’s deposition testimony to suggest his methods are unsupported. Mot. at 9 (quoting excerpts of Singer Merits Dep.). The full answer Google omits shows that “goodness of fit will tell you if the Logit is ... the relevant way to describe preferences in substitution patterns here.” Ex. 7 (Singer Merits Dep.) at 104:12-105:6, 105:23-106:8.⁵

In contrast to Dr. Singer’s data analysis, which confirms that logit describes demand within each app category well, Google relies solely on anecdotal argument. Dr. Leonard has not performed any empirical analysis of substitution. Ex. 3 (Leonard Rpt.) ¶ 66. Nor has Google identified any alternative analysis Dr. Singer could have performed.⁶ Lacking empirical support, Google argues that “just one” example will do, highlighting QuickBooks Online Accounting, an accounting app, and Thumbtack, an app that connects consumers to professionals. Mot. at 9. But even Google’s one example fails because

⁵ Dr. Rysman’s testimony which Google cites, Mot. at 9 n.4, simply says that “negative correlation between price and demand” would “[n]ot by itself” indicate that “the logit model was appropriate.” Ex. 9 (Rysman Dep.) 68:21-69:2. Dr. Rysman had not read Dr. Singer’s report. *Id.* at 42:21-25.

⁶ No expert in this case has applied the statistical test for logit developed by Hausman and McFadden, given that it is not applicable here. Ex. 7 (Singer Merits Dep.) 86:17-87:6, 96:12-20, 103:19-104:11. Logit is commonly used without applying that test. *See, e.g.*, Ex. 10 (Frank Verboven & Theon van Dijk, *Cartel Damages Claims and the Passing-on Defense*, 57(3) JOURNAL OF INDUSTRIAL ECONOMICS 457, 457-91 (2009)) (Hausman-McFadden test not mentioned in article using logit to measure pass-through from cartel); Ex. 8 (Froeb 2018) (Hausman-McFadden test not mentioned in discussion of DOJ economists’ use of logit, nor offered in the accompanying antitrust software manual, available at: <https://cran.r-project.org/web/packages/antitrust/antitrust.pdf>); Ex. 11 (Frank Verboven, *International Price Discrimination in the European Car Market*, 27(2) RAND JOURNAL OF ECONOMICS 240, 240-68 (1996)) (Hausman-McFadden test not mentioned in logit analysis of European auto pricing).

QuickBooks and Thumbtack are substitutes. Thumbtack includes professional listings for “Accountant,” “Small Business Accounting,” and “Business Accounting,” which a user could employ rather than buying QuickBooks. Ex. 12 (Thumbtack Webpage Excerpts).

Substantial record evidence likewise supports that Google’s app categories meaningfully organize substitution. Google dismissively says that its “maintenance of the categories says nothing about substitution between apps,” Mot. at 9, but ignores that it does more than just maintain the categories. Evidence shows that the Play Store’s categories are not “haphazardly assigned or done without any kind of economic logic.” Ex. 7 (Singer Merits Dep.) 90:11-12. Google tells developers that “[c]ategories and tags help users to search for and discover the most relevant Apps,” Ex. 1 (Singer Rpt.) ¶ 349 (citation omitted), and uses the categories for its own internal analyses of consumer spending and discovery. *E.g.*, Ex. 13 (GOOG-PLAY-000579868.R) at -870.R; Ex. 1 (Singer Rpt.) ¶¶ 349-51 (compiling Google and external analyses that use app categories). The categories represent economically reasonable groupings of consumer tastes for different varieties of Apps. Ex. 1 (Singer Rpt.) ¶ 349.

Second, even accepting Google’s inaccurate factual contentions, Google’s premise that logit fails if even one app in a category is not a substitute is false. Logit “does not imply that all products in the market are perfectly interchangeable, but instead allows for product differentiation.” Ex. 1 (Singer Rpt.) ¶ 351 (citing peer-reviewed literature). As Dr. Singer testified, even if proportional substitution does not hold for *every* app, the logit model would still be reliable, because “[i]n any econometric model ... we make all sorts of demands on the nature of the error terms in the model, just as we do here.” Ex. 7 (Singer Merits Dep.) 89:20-90:16. Even if proportional substitution is not strictly satisfied, an economist may “use the logit model ... considering the model to be an approximation.” Mot. Ex. 8 (Train, *Logit*) at 36.

For this reason, Google’s excerpts of testimony suggesting Dr. Singer concedes that not all apps in a given category are perfect substitutes get it nowhere. In each case, Dr. Singer noted that even if each app is not a perfect substitute, the model provides a reasonable estimation of competition within the category. *See* Ex. 14 (Singer Class Dep.) at 158:6-160:1; Ex. 4 (Hot Tub Tr.) at 116:13-117:21 (categories “are a meaningful arena of competition around which one can use for estimating shares for the logit model”).

Neither Google’s brief nor its economist cite any literature for the proposition that cherry-picked

examples of apps that are not perfect substitutes within a category undermine pass-through estimates. Ex. 3 (Leonard Rpt.) ¶ 72 n.76; *see also id.* ¶ 153 (arguing only that “IIA restrictions on substitution patterns can be especially misleading in the context of new product introduction”). As Dr. Singer has explained, logit does not require that all apps within a category are substitutes from the perspective of all consumers. Ex. 7 (Singer Merits Dep.) 78:17-21. Meanwhile, Dr. Singer has cited extensive literature showing that logit is widely used to estimate pass-through in a variety of contexts.⁷

Google’s citations concerning unrealistic “forecasts” from the logit model concern an entirely different application of logit. Each concerns the reliability of forecasting consumer substitution when new or different products are introduced. *See* Mot. Ex. 9 (McFadden, *Economic Choices*) at 357-58 (logit gives “an easy formula for forecasting demand for new alternatives”); Mot. Ex. 8 at 47-48 (discussing non-proportional substitution from small and large gas cars to small electric cars). As Dr. Singer explained: “the forecast that McFadden [the author of Mot. Ex. 9] has in mind here are forecasts that are made from the parameters of the Logit model after it’s estimated, right. I’m not making any such forecast. That’s not what I’m using it for.” Ex. 7 (Singer Merits Dep.) 418:17-419:20. Put differently, Dr. Singer’s pass-through model does not rely on forecasting consumer substitution to new or different products; consumers make the *same purchases* at lower prices after take rates fall across the board.

B. Dr. Singer Accounted for Focal Point Pricing

Google’s argument that Dr. Singer fails to consider focal point pricing fails for two basic reasons. Google has not shown that focal point pricing will affect pricing in the but-for world, and Google ignores that Dr. Singer’s methodology can account for focal point pricing.

First, there is very little evidence that focal point pricing would dictate pricing in the but-for world. Dr. Singer presented significant evidence that developers can and do depart from 99-cent focal point intervals. Ex. 1 (Singer Rpt.) ¶ 405. For example, Google previously mandated a 99-cent price

⁷ *See, e.g.*, Ex. 1 (Singer Rpt.) ¶ 356, nn.835-37; Ex. 15 (Nathan Miller, et al., *Pass-Through and the Prediction of Merger Price Effects*, 64(4) JOURNAL OF INDUSTRIAL ECONOMICS 683, 693 (2016)) (Table 1 shows pass-through estimates for logit); Ex. 10 (Verboven & van Dijk 2009) (using logit to analyze the extent to which direct purchasers overcharged by the European vitamin cartel would pass on the overcharges to indirect purchasers.); Ex. 16 (K. Sudhir, *Structural Analysis of Manufacturer Pricing in the Presence of a Strategic Retailer*, 20(3) MARKETING SCIENCE 244, 249-51 (2001)) (using logit to analyze pass-through of wholesale supermarket prices into retail prices paid by consumers).

1 floor; approximately █% of developers reduced their prices below 99-cents within the first year that
 2 restriction was lifted. Ex. 1 (Singer Rpt.) ¶ 406; Ex. 7 (Singer Merits Dep.) at 121:16-122:2. Google’s
 3 evidence of the importance of 99-cent focal point intervals is limited to one footnote in Dr. Leonard’s
 4 report, Ex. 3 (Leonard Rpt.) ¶ 32 n.7, even as Dr. Leonard elsewhere argues that “there are *many* different
 5 price points across apps” and that “there are rarely two apps that have the same price,” *id.* ¶ 142 & Figs.
 6 14-17. Dr. Singer thus reasonably concluded that “the prospect of focal point pricing getting in the way,
 7 even for those [developers] who care about it ... of a price reduction is ... remote.” Ex. 7 (Singer Merits
 8 Dep.) 122:3-123:3.⁸ Here there is no “overwhelming evidence” suggesting that “developers would
 9 choose to price their apps at focal points ending in 99 cents.” *In re Apple iPhone Antitrust Litig.*, No. 11-
 10 cv-6714-YGR, 2022 WL 1284104, at *8 (N.D. Cal. Mar. 29, 2022). There is little reason for Dr. Singer
 11 to account for focal point pricing in his models on this record.

12 *Second*, even if focal point pricing would guide but-for world pricing, Dr. Singer has empirically
 13 demonstrated that his model can accommodate it. Ex. 1 (Singer Rpt.) ¶¶ 407-13. In short, Dr. Singer’s
 14 model can be modified such that the developer reduces the price to the nearest focal point interval, rather
 15 than precisely to the but-for profit-maximizing price. *Id.* ¶¶ 411-12. Using 10-cent focal point intervals,
 16 which Dr. Singer notes are common in Google’s transactional data, adjusting for focal point pricing
 17 resulted in only █% of transactions not seeing a price decrease in the but-for world. *Id.* ¶¶ 407, 413.
 18 Dr. Singer demonstrated that his model can be mechanically adjusted to account for focal point pricing.

19 **C. Dr. Singer Accounted for Developers’ Costs**

20 Dr. Singer’s pass-through calculations account for developers’ other marginal costs beyond the
 21 take rate. The initial equations from which the standard logit pass-through formula was derived include
 22 a term for developers’ marginal costs. *See* Ex. 17 (Nathan Miller, et al., *Using Cost Pass-through to*
 23

24
 25 ⁸ Google selectively quotes Dr. Singer’s testimony and outright mischaracterizes Dr. Rysman’s
 26 testimony on focal point pricing. Google’s claim that Dr. Singer concluded that “focal point pricing is
 27 an important consideration here” takes that exchange out of context, and any implication that Dr. Singer
 28 did not consider it is belied by his report and other deposition testimony. *See* Ex. 7 (Singer Merits Dep.)
 at 121:8-15; Ex. 1 (Singer Rpt.) ¶¶ 405-06; Ex. 2 (Singer Reply) ¶ 8 n.21. Google claims Dr. Rysman
 conceded that “some firms would not change price in response to a change in the commission rate.” Mot.
 at 2 (quoting Rysman Dep.). Dr. Rysman said that would be the case “[i]f focal point pricing is
 important,” but then testified “I didn’t study that issue.” Ex. 9 (Rysman Dep.) at 62:16-63:15.

1 *Calibrate Demand*, 118 ECONOMICS LETTERS 451, 452-453 (2013)). As Dr. Singer testified, when “you
2 look at the most common functional forms [of demand curves,] [y]ou’ll often see that marginal cost
3 drops out of the pass-through equation.” Ex. 7 (Singer Merits Dep.) 147:9-17. In short, standard
4 economics shows that knowledge of developers’ *other* marginal costs is not necessary to calculate pass-
5 through.

6 Google cites only Dr. Leonard’s report and selections of Dr. Singer’s deposition to say he should
7 have done more to account for those costs. But Dr. Leonard cites no literature in support of his claim,
8 Ex. 3 (Leonard Rpt.) ¶ 32 & n.7; Ex. 6 (Leonard Dep.) at 104:23-105:6, and relies solely on his own
9 calculations that do not appear in any literature, Ex. 6 (Leonard Dep.) at 106:5-110:3. Google also repeats
10 its false claim from class certification that “Dr. Singer concedes that pass-through of a service fee will
11 be proportional to the developer’s other marginal costs.” Mot. at 2; Dkt. 252 at 7. That testimony
12 concerns a separate equation which cannot be used—and that no expert has suggested could be used—
13 to calculate pass-through. Ex. 14 (Singer Class Dep.) at 105:8-109:14. Google’s citation omits the middle
14 of the quoted exchange, where Dr. Singer specifies that “when I go to model the precise amount of pass-
15 through,” it “takes me to a pass-through rule that isn’t necessarily going to be denominated in terms of
16 costs.” *Id.* at 107:8-22. As noted above, other marginal costs drop out of the equation once a demand
17 curve is applied. Ex. 17 (Miller 2013) at 452-53. Google has no support for its suggestion that Dr. Singer
18 needs to determine every developer’s exact level of other marginal costs to determine pass-through.⁹

19 **D. Dr. Singer Used Extensive Available Data**

20 Finally, Google argues that Dr. Singer has not “conducted any statistical analysis” of pass-
21 through and instead “has chosen a formula to guarantee it.” Mot. at 11-12. Again, Google is wrong—
22 Dr. Singer used data at every step of his analysis. Dr. Singer did not simply “choose” the logit formula—
23 he ran regressions across Google’s transactional data to confirm that logit described the demand faced
24 by app developers better than other demand curves. Ex. 2 (Singer Reply) ¶ 7 & n.19. This case is nothing
25 like *Sidibe v. Sutter Health*, 333 F.R.D. 463 (N.D. Cal. 2019), where the expert simply assumed 100%
26 pass-through based on one document in the record. *Id.* at 497. Dr. Singer also used Google’s transaction
27

28 ⁹ Indeed, doing so would be impossible—Dr. Leonard testified with respect to each developer’s
marginal costs: “I just don’t think that information is available.” Ex. 6 (Leonard Dep.) at 87:13-88:7.

1 data to confirm that developers pass through *ad valorem* taxes (similar to the take rate here) in the form
 2 of higher prices. Ex. 2 (Singer Reply) ¶ 8. Finally, Dr. Singer engaged with, and extensively rebutted,
 3 Dr. Leonard’s use of Google’s transaction data. *Id.* ¶¶ 19-39.

4 In fact, Dr. Leonard has employed similar methods to Dr. Singer’s work in the past. Dr. Leonard
 5 represented the merging companies in FTC proceedings related to the merger of Staples and Office
 6 Depot. Ex. 18 (Jerry Hausman & Gregory Leonard, *Efficiencies from the Consumer Viewpoint*, 7(3)
 7 GEO. MASON L. REV. 707, 726 (1999) (PX-2853)). There, the FTC conducted an empirical study and
 8 found that only 21% of cost savings from the merger would be passed on to consumers. *Id.* Dr. Leonard
 9 criticized this empirical estimate as “implausibl[e]” suggesting the FTC’s “estimates were downward
 10 biased, e.g., because of measurement error.” *Id.* at 726 n.47. Dr. Leonard found that the “[demand]
 11 curvature implied by the Staff’s pass-through estimate” was “quite unlikely to hold in practice.” *Id.* at
 12 726. Dr. Leonard concluded that “[t]he knowledge that at least 50 percent of the cost savings will be
 13 passed on to consumers could have a significant effect on the Agencies’ evaluations of merger[s].” *Id.*
 14 at 727. Put simply, Dr. Leonard concluded that an analysis like Dr. Singer’s—using the demand curve
 15 to derive a pass-through rate—was more reliable than an empirical analysis of a subset of data—as Dr.
 16 Leonard did here.

17 At bottom, Google’s argument is not that Dr. Singer ignored available data, it is that his use of
 18 the data and analysis draws conclusions Google doesn’t like. Disagreement with the *output* of an expert’s
 19 methodology is no grounds for exclusion. *Elosu v. Middlefork Ranch Inc.*, 26 F.4th 1017, 1024 (9th Cir.
 20 2022) (“Ultimately, the test under *Daubert* is not the correctness of the expert’s conclusions but the
 21 soundness of his methodology.” (quotation marks and citation omitted)).

22 II. Dr. Singer’s Consumer Subsidy Overcharge Models Are Admissible and Reliable

23 Google argues that Dr. Singer’s consumer subsidy models are both inadmissible for the class and
 24 unreliable. Neither argument has merit. As a preliminary matter, that the Court did not rely on the model
 25 at class certification is of no matter. *Comcast Corp. v. Behren* stands for the proposition that damages
 26 must be connected to “the particular antitrust injury on which [defendant’s] liability in this action is
 27 premised.” 569 U.S. 27, 36 (2013). Unlike in *Comcast*, each of Dr. Singer’s damages models flow from
 28 the same theory of antitrust impact—that Google’s conduct has blocked competitors from the Android

App Distribution Market and In-App Aftermarket resulting in higher consumer prices—but models that price impact on separate ends of the market. *See Krueger v. Wyeth, Inc.*, 310 F.R.D. 468, 482 (S.D. Cal. 2015) (“[u]nlike the situation in *Comcast*, there is no possibility in this case that damages could be attributed to defendants’ acts that are **not** challenged on a class-wide basis”). There is no *Comcast* issue because both models flow from the same theory of liability. And, of course, Dr. Singer may present his other models on behalf of the States and individual consumers.¹⁰

Dr. Singer’s calculations of overcharge damages based on discounts are also reliable. The discount model is built upon the same Rochet-Tirole model that Google does not challenge, with the exception of some inputs. The Amazon model is built on a reliable benchmark of the real-world entrant that has chosen to compete with consumer discounts.

A. Dr. Singer’s Discount Model Is Reliable

Google raises two issues with Dr. Singer’s discount model: (1) that he failed to analyze Play Points participation rates with specificity, and (2) that he used unreliable economic data for one input. Both criticisms are at best grist for cross-examination and do not merit exclusion of his testimony at trial.

First, Dr. Singer relied on substantial record evidence to conclude that the discounts Google provides consumers in the but-for world would benefit all or nearly all consumers. About [REDACTED] of consumers have already signed up for Play Points today, even though the Play Points subsidy “is [REDACTED] right now.” Ex. 14 (Singer Class Dep.) 293:21-294:9; 298:4-21. In a more competitive world, Google would have clear economic incentives to automatically provide discounts to users, or at least to minimize enrollment costs, so “they would not be so prohibitive as to allow [a but-for] rival to eat their lunch.” Ex. 7 (Singer Merits Dep.) 168:19-169:7. Substantial record evidence shows that even modestly higher discounts lead to widespread enrollment. Ex. 1 (Singer Rpt.) ¶¶ 371-383; Ex. 19 (AMZ-GP_00002484) at -488 (greater than 90% usage of Amazon coins); Ex. 20 (GOOG-PLAY-000004957.R) at -969.R (“spend coverage of [REDACTED] percent” for Play Points [REDACTED] within just one year).

¹⁰ Google also claims Dr. Singer opined that the model only addresses “aggregate damages,” but as Dr. Singer explained shortly after: “for a given member of the class, you could estimate what the reduction in – in his or her net payments would be relative to what they spent in the actual world.” Ex. 7 (Singer Merits Dep.) at 164:17-166:14; *see also id.* at 172:7-12 (“Q: And if I – again, if I took a user at random from the – from the data on the users of the Google Play Store, could your Amazon Coins model tell me whether – how much in subsidy that consumer would have received? A: Yes.”).

Dr. Singer relied on that evidence to conclude that “a safe inference is that all or almost all consumers will avail themselves of that option.” Ex. 7 (Singer Merits Dep.) 167:11-25. Google has not shown why he must do more to account for low participation rates that flow from current meager discounts, an artifact of Google’s conduct. *See In re Mushroom Direct Purchaser Antitrust Litig.*, No. 06-0620, 2015 WL 5767415, at *6 (E.D. Pa. July 29, 2015) (reliable method “may properly include making assumptions so long as those assumptions are sufficiently grounded in available facts” (citation omitted)).

Second, Google criticizes one of the inputs to the discount model. Dr. Singer made a reasonable economic choice in relying on peer-reviewed literature studying AT&T as its market share declined to 60% with competition to calculate the but-for price elasticity. Ex. 1 (Singer Rpt.) ¶ 386 n.920. Economic models are not industry-specific; what matters are similarities in competitive dynamics—AT&T is a prime example of a platform monopolist, benefitting from network effects, that leveraged monopoly power into an ancillary market, before being forced to open the market to competition. *See id.* ¶ 331; Ex. 2 (Singer Reply) ¶ 42. If Google’s criticism is that a higher tech benchmark is necessary, Dr. Singer also provided several other benchmarks which result in a *lower* but for market share—and *higher* damages—demonstrating that his use of AT&T was conservative. *Id.* ¶¶ 43-46 (analyzing post-monopolistic market shares of Netflix (25%), IBM (24.6%), and Internet Explorer/Edge (4%)). Neither Google nor Dr. Leonard have proposed an alternative benchmark or calculated an alternative but-for market share.

Finally, the precise value of Google’s but-for market share does not “dramatically” affect Dr. Singer’s model as Google suggests. Mot. at 13. Changes to this single input result in only minor changes in the model’s predictions. Ex. 7 (Singer Merits Dep.) 151:24-153:4; *see also* Ex. 2 (Singer Reply) ¶ 49. Thus, even if the AT&T benchmark is not precise, it does not significantly impact the results. In any case, criticisms of an input are grounds for cross-examination, not exclusion. *See Victorino v. FCA US LLC*, No. 16-cv-1617-GPC, 2018 WL 2767300, at *3 (S.D. Cal. June 7, 2018) (“[u]nder Rule 702 and Daubert, the proper analysis is not whether some of the inputs can be questioned” (citation omitted)).

B. Dr. Singer’s Amazon Model Is Reliable

Finally, Dr. Singer’s Amazon Model is a reliable alternative measure of overcharge to consumers, based on a benchmark of Google’s most prominent worldwide competitor that courted consumers with discounts. Google’s arguments to the contrary are merely cross examination points.

1 *First*, as with the discount model, Dr. Singer’s Amazon model can calculate individual damages.
 2 The discount derived from the model can be mechanically applied to each consumer’s purchase history,
 3 just as with the other models. *See* Ex. 7 (Singer Merits Dep.) 171:22-172:12.

4 *Second*, the discounts Amazon provides to consumers on Android devices are a reliable
 5 benchmark for Google’s consumer subsidies in a but-for world where it would have been forced to
 6 compete for consumers directly by lowering app prices. The Amazon app store is the only available
 7 benchmark (1) of a store competing in the Android App Distribution Market through use of consumer
 8 discounts; (2) of a rival with Amazon’s stature; (3) with record evidence indicating a sustained attempt
 9 at robust competition on Google Android devices; and (4) with available data revealing the magnitude
 10 of discounts actually received by consumers in the actual world. Ex. 1 (Singer Rpt.) ¶¶ 198-200, 417-20.
 11 While other app stores on Android may meet some of those points, Google has not identified any
 12 alternative benchmark that meets these (or similar) criteria. For example, while ONE Store offered
 13 consumer discounts in Korea, it does not have the same worldwide reach as Amazon, and data
 14 quantifying its discounts is not available. *Id.* ¶¶ 308, 377; Ex. 7 (Singer Merits Dep.) 181:18-182:11.¹¹
 15 This is not a situation like *In re Apple iPhone Antitrust Litig.*, 2022 WL 1284104, at *3-4, where an
 16 expert “cherry-picked” one of many benchmark candidates from a different market.

17 Google also complains that Amazon offers its discount (coins) in a different form than Google
 18 offers its discounts (points) in the actual world. But it does not explain why that makes Amazon a less
 19 effective benchmark—

20 [REDACTED] The relevant economic question is the total discounts consumers would receive,
 21 and a competitor could sustain, in the face of competition. Ex. 2 (Singer Reply) ¶ 56. In a competitive
 22 market, Google would have the incentive to not only match those discounts, but to provide them in either
 23 the same form, or in a form that is just as valuable to consumers, so that it could effectively compete.

24 **Conclusion**

25 For the foregoing reasons, Google’s motion to exclude Dr. Singer’s testimony should be denied.

26
 27 ¹¹ Google claims that Dr. Singer did not “analyze whether any other app stores that his report identifies
 28 as potential benchmarks” would be a better fit. Mot. at 15. But the testimony Google cites *does* analyze
 ONE Store, and the other items in that table, with the exception of Aptoide, are not Android app stores.
 Ex. 7 (Singer Merits Dep.) 181:18-183:5 (referencing Table 7 of Ex. 1, Singer Rpt.)

1 Dated: May 18, 2023

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9
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E-FILING ATTESTATION

I, Karma M. Giulianelli, am the ECF User whose ID and password are being used to file this document. In compliance with Civil Local Rule 5-1(h)(3), I hereby attest that each of the signatories identified above has concurred in this filing.

/s/Karma M. Giulianelli

Karma M. Giulianelli

Exhibit F2

Public Redacted Version

FILED UNDER SEAL

Exhibit

7

ATTORNEYS' EYES ONLY

Page 1

1 UNITED STATES DISTRICT COURT
2 NORTHERN DISTRICT OF CALIFORNIA
3 SAN FRANCISCO DIVISION

4 IN RE GOOGLE PLAY STORE : Case No.
5 ANTITRUST LITIGATION : 3:21-md-02981-JD

6 This Document Relates To:

7 State of Utah et al. v.

8 Google LLC et al.

9 Case No. 3:21-cv-05227-JD

10 Match Group, LLC et al. v.

11 Google LLC et al.

12 Case No. 3:22-cv-02746-JD

13 Epic Games Inc. v. Google

14 LLC et al.

15 Case No. 3:20-cv-05671-JD

16 In Re Google Play

17 Consumer Antitrust

18 Litigation

19 Case No. 3:20-cv-05761-JD

20 ** ATTORNEYS' EYES ONLY **

21 TUESDAY, APRIL 4, 2023

22 Video Recorded and Remote Zoom

23 Deposition of HAL J. SINGER, Ph.D., taken
24 pursuant to Notice, at the law offices of
25 Munger, Tolles & Olson LLP, 601 Massachusetts
Avenue NW, Washington, DC, commencing at
approximately 9:11 a.m., on the above date,
before Rose A. Tamburri, RPR, CM, CCR, CRR,
USCRA Speed and Accuracy Champion and Notary
Public.

ATTORNEYS' EYES ONLY

Page 77

1 Q. Have you done any study of why
2 developers pick one category over the other
3 for their apps?

4 A. Well, I've studied which ones they've
5 picked, and I think that it's -- it's a fairly
6 safe economic inference that you would want to
7 pick the category that most naturally contains
8 the type of app that you're selling; in other
9 words, it would be disorienting to a consumer
10 if you were one type of app, let's say a
11 children's app, and put yourself in the
12 Productivity category, you wouldn't be
13 discovered; they would engender confusion.

14 So I feel like there's a lot of --
15 if makes a lot of sense, and I feel like we
16 should -- we should attach a lot of economic
17 meaning to the decisions that the individual
18 apps made when they self-selected the
19 categories.

20 Q. A developer's selection of a
21 category, in your view, says something about
22 their marketing decision?

23 A. Not only their marketing decision,
24 but how they see themselves in the contours
25 of -- of competition with other apps.

ATTORNEYS' EYES ONLY

Page 78

1 Q. Do you agree that if Google's app
2 categories are not reliable to use with the
3 Logit model, then your model is not reliable?

4 A. I don't think I'd -- I don't think
5 I'd go that far. It is -- it is important
6 that the categories have economic meaning, but
7 I also have faith in the model because it's
8 the most widely used model for pass-through in
9 economics and application in antitrust, but
10 also because the fit is so good.

11 So I feel like there are -- there
12 are several independent legs or bases on which
13 the model rests, and you're -- you're taking
14 away an important one, but I don't think that
15 the model necessarily falls because of it.

16 Q. Okay.

17 Now, it's not your opinion that
18 every app in every category is a substitute
19 for every other app in that category?

20 A. Not from the perspective of every
21 consumer, but from the perspective of at least
22 some consumers, I do think that everything
23 would meet that -- would meet that criteria.

24 Q. Okay.

25 But some apps in each category are

ATTORNEYS' EYES ONLY

Page 85

1 Logit model is known as the independence of a
2 relevant alternative's property?

3 A. Yes.

4 Q. And the independence of a relevant
5 alternative's property says that all products
6 being studied in the Logit model should be
7 substitutes in proportion to their share?

8 A. I think that's fair.

9 Q. Okay.

10 Now, if the indepen -- indepen --
11 if the -- well, let's back up.

12 Can we call it the independence of
13 a relevant alternative's property IIA?

14 A. Sure.

15 Q. Okay.

16 And if the IIA assumption is not
17 satisfied in the Logit model, then the Logit
18 model can lead to unrealistic forecasts; is
19 that right?

20 A. I'm not going to say so necessarily.
21 I think that it could produce estimates that
22 are different than the true parameters that
23 you're hoping to estimate, but I think the
24 word that you used was unreliable? And I
25 felt --

ATTORNEYS' EYES ONLY

Page 86

1 Q. Well --

2 A. -- I felt like that was too harsh.

3 Q. Well, let me just ask you this:

4 Does your Logit model satisfy the
5 IIA property?

6 A. I believe it does, yes.

7 Q. And if your Logit model does not
8 satisfy IIA, would that lead you to have any
9 concern that its forecasts are unrealistic?

10 A. Well, it would depend on -- on how
11 badly these assumptions were violated. So I
12 think that they're not. I think that the --
13 the groupings here were economically
14 reasonable. These are not my groupings; these
15 are Google's groupings that are then
16 self-selected by the -- by the apps.

17 And there are tests for IIA, I
18 think Haus -- Hausman and maybe McFadden have
19 developed a test. It's -- it has its flaws as
20 well. Those tests are not feasible here
21 because we don't have consumer level data.
22 We're -- we're just seeing the apps shares.
23 So we'd have to drop the entire app out of the
24 dataset, in which case you'd get the same
25 findings, and so you'd always affirm the IIA.

ATTORNEYS' EYES ONLY

Page 87

1 Your experts, of course, didn't
2 show that IIA wasn't satisfied through those
3 tests either, which I think is confirmation
4 that we can't do those tests. But I feel
5 confident the IIA is reasonably satisfied
6 here.

7 MS. GIULIANELLI: We can -- you
8 can continue on, but at some point, let's take
9 a break. We're -- I don't want to interrupt
10 your --

11 MR. RAPHAEL: I'm happy to take a
12 break now.

13 THE WITNESS: Great.

14 THE VIDEOGRAPHER: Going off
15 record, the time is 10:37.

16 (Whereupon, a recess was taken at
17 the above time.)

18 THE VIDEOGRAPHER: Going back on
19 the record. The time is 10:47.

20 BY MR. RAPHAEL:

21 Q. Dr. Singer, is it your opinion that
22 Google established the categories in the Play
23 Store with the IIA property in mind?

24 A. That is doubtful. I think the record
25 evidence tells us that Google established the

1 categories based largely on how Apple chose
2 its categories.

3 Now, it's possible that just as a
4 -- a pool player doesn't have physics in the
5 back of their mind, that they're -- they're
6 respecting the laws of physics. I think
7 that's a famous Bill Friedman quote, that when
8 Google is assembling its categories, it's
9 doing it in a way that satisfies the IIA.

10 But it certainly would be
11 astounding if -- if they had, if some
12 marketing person had the IIA at the top of the
13 mind when they were selecting the categories.

14 Q. Right.

15 Because to your knowledge,
16 Google's decision with -- to establish the
17 categories in the Google Play Store was made
18 as a matter of marketing?

19 MS. GIULIANELLI: Objection to
20 form.

21 THE WITNESS: I think -- I think
22 that as I just stated, the record evidence
23 suggests that Google was -- had an eye towards
24 how Apple had designed its own categories, and
25 I think that ultimately Google wants to

ATTORNEYS' EYES ONLY

Page 89

1 maximize the profits of the -- of the Play
2 Store, and so it wants consumers to be able to
3 find things easily and sensibly and it's --
4 it's profit drivenal; how about that?

5 BY MR. RAPHAEL:

6 Q. And in trying to maximize the
7 profitability of the Play Store, Google
8 established the categories by reference to the
9 categories in the Apple App Store; is that
10 right?

11 A. In part, yes. That Google -- that
12 Apple made presumably intelligent choices,
13 Apple's App Store was doing well and -- and
14 Google figured that given that they are
15 recruiting some of the same developers who are
16 already on the App Store, that it would make
17 sense to not disorient developers in the
18 same -- in that sense.

19 Q. Okay.

20 If the IIA assumption is not
21 satisfied, then the Logit model can lead to
22 unrealistic forecasts.

23 Do you agree with that?

24 A. No, I think -- I think you asked me
25 that earlier, and I think that it depends on

ATTORNEYS' EYES ONLY

Page 90

1 the degree to which it's not satisfied, right?

2 In any econometric model, just
3 even ordinary lease squares, we -- we -- we
4 make all sorts of demands on the nature of the
5 error terms in the model, just as we do here.
6 And there are -- there are errors, there are
7 violations and there are other violations.
8 And so I wouldn't -- I wouldn't condemn it
9 based on -- on some small violation.

10 I think -- I think that if the
11 categories were haphazardly assigned or done
12 without any kind of economic logic such that
13 consumers did not perceive, or at least some
14 consumers did not perceive the elements to be
15 substitutes, that -- that you could get
16 unreliable forecasts.

17 Q. Okay.

18 So if consumers do not believe
19 that the products being studied in the Logit
20 model are substitutes, you can get unreliable
21 forecasts?

22 MS. GIULIANELLI: Objection to the
23 form.

24 THE WITNESS: I think that the
25 better -- the better requirement, or the more

ATTORNEYS' EYES ONLY

Page 91

1 formal requirement, is that if -- if this
2 property of substitution that is at the heart
3 of Logit, which is this proportional
4 substitution, that people tend to go places
5 with higher shares, then you could get a less
6 accurate forecast than -- than -- than you
7 would hope.

8 I think that unreliable is -- is
9 fairly strong language, so I'm reluctant to go
10 that far.

11 MR. RAPHAEL: Okay.

12 BY MR. RAPHAEL:

13 Q. And what is the standard for when IIA
14 has been violated to such a degree that you
15 think that the -- using the Logit model would
16 lead to forecasts that are inaccurate?

17 A. So here's some things I -- I would
18 want to look for, is did the categories make
19 economic sense, all right? Is there -- is
20 there good economic basis to believe that both
21 the developers and the consumers perceived
22 those cat -- categories to define the contours
23 of competition? And I think we have that
24 here.

25 But the second thing that I'd want

ATTORNEYS' EYES ONLY

Page 95

1 trying to predict are, say, the -- the
2 predicted shares within a category and he
3 thinks that those forecasts could be off,
4 that's not the forecast that I'm making. So
5 it's just the word "forecast" is so general
6 that it's hard for me to -- to say that it has
7 much relevance here.

8 Q. Do you agree that the Logit model can
9 produce seriously misleading forecasts if IIA
10 fails?

11 A. Seriously misleading forecasts?

12 Q. Um-hmm.

13 A. Well, so here we're trying to predict
14 pass-through rates, and I don't think that our
15 pass-through rate forecast is going to be
16 seriously misleading for some minor infraction
17 of the IIA. And in particular, you know,
18 what's happening is that on a technical
19 matter, we're -- we're concerned about some
20 unobserved attribute being correlated with the
21 error terms. But if the groupings are done in
22 an intelligent fashion, all these error terms
23 are going to cancel. They're going to wash
24 out.

25 And so I feel like -- I feel like

ATTORNEYS' EYES ONLY

Page 96

1 again, so long as the groupings are
2 intelligent, so long as the model fits and
3 you're getting statistically significant
4 coefficients on the price terms, the R-squared
5 is high, I think that's all telling you that
6 -- that you could have good faith in the
7 accuracy and integrity of the prediction.

8 Q. Are you familiar with an economist
9 named Dan McFadden?

10 A. Yes.

11 Q. Who is Dan McFadden?

12 A. So McFadden is a Nobel Prize winner.
13 He is a pioneer in the area of conjoint,
14 choice base conjoint surveys, and McFadden is,
15 who I mentioned earlier about the
16 Hausman-McFadden test for IIA, which is itself
17 partially controversial; it's not -- not the
18 best test ever, but -- but in any event, it
19 can't be applied here, given the nature of the
20 data that we have.

21 Q. Okay.

22 Are you familiar with the Red
23 bus/Blue bus problem?

24 A. I've come across it. I've come
25 across it before, but -- but you might have to

ATTORNEYS' EYES ONLY

Page 97

1 remind me as to exactly how the problem works.

2 Q. So sitting here today, can you tell
3 me about the Red bus/Blue bus problem in
4 economics?

5 A. I don't think I can give you great
6 detail on the Red bus/Blue bus, but -- but if
7 we're going into choice probabilities, then
8 McFadden and Hausman would be talking about
9 the likelihood that you'd choose one or the
10 other in the presence or absence of the -- of
11 -- of one of your choices.

12 Q. Okay.

13 Now, did you run any test in this
14 case to determine whether the IIA assumption
15 was met, and if not, whether it was producing
16 unrealistic forecasts?

17 A. Yes. And so the way that we got
18 comfortable with the Logit and that the IIA
19 was satisfied was, again, that the groupings
20 were done by Google and self-selected by the
21 firms. The model tended -- did a very good
22 job fitting each category, we got the right
23 sign, it was statistically significant, we got
24 a high R-squared.

25 We tested other demand

ATTORNEYS' EYES ONLY

Page 102

1 intent that was at the front of my mind was
2 will the Logit model do a good job or a bad
3 job at explaining substitution patterns within
4 a given category, right? And implicit in that
5 objective is whether the IIA was satisfied.

6 Q. Did you cite any published economics
7 article in your reports to establish that it's
8 appropriate to test the IIA assumption using
9 the kind of regression that you did?

10 A. I don't think I've cited articles in
11 my report that my test was a test of IIA. I
12 think that I feel confident that IIA was
13 satisfied by virtue of the fact that Google
14 selected the categories, the developers
15 selected in, the model fit well and then
16 finally, I tested the model under other demand
17 specifications.

18 There was quite literally nothing
19 else that I could do and there was nothing
20 that your expert did in rebutting it, zero.

21 Q. Right.

22 A. Nothing. Dr. Leonard did no test of
23 the IIA.

24 Q. Right.

25 Other than the regression that you

ATTORNEYS' EYES ONLY

Page 103

1 did, there was no way for you to test whether
2 the IIA assumption was met; is that right?

3 A. No, that's not right. You're not --
4 you're not hearing what I'm saying.

5 I have confidence that the IIA was
6 satisfied because these are economically
7 sensible categories that were designed by
8 Google, that were selected into by the
9 developers. And then when we go to do the
10 actual fit, had the results come back
11 differently, had the coefficients been the
12 wrong sign, had they not been significantly
13 significant, had the R-squareds been low, and
14 then had another demand model done a better
15 job at explaining the variation of the
16 substitution patterns in the data, I would
17 have abandoned Logit.

18 Q. Okay.

19 Other than your regression, was
20 there any test you are aware of that you could
21 have applied to determine whether the IIA
22 assumption was met?

23 A. Yes, and I now feel like I'm
24 repeating myself. There is the
25 Hausman-McFadden test.

ATTORNEYS' EYES ONLY

Page 104

1 Q. But you couldn't apply that here,
2 could you?

3 A. Let me finish. Let me just finish.

4 Yeah, the Hausman-McFadden test
5 requires you to drop all consumers from the
6 data who selected a particular choice and then
7 re-estimate the model and -- and compare the
8 coefficients, right?

9 Yes, you cannot do that here
10 because we don't have that kind of granularity
11 in the data.

12 Q. Are you aware of any source in
13 economics that indicates that it is an
14 appropriate and reliable way to test for the
15 IIA assumption to do the kind of regression
16 that you did here?

17 A. I don't think that that's how you'd
18 find it in a textbook. I think that the way
19 that an econometrician would counsel you is
20 you have an assumption about how consumers
21 choose within a category; right? If the model
22 doesn't fit well, then that would tend to
23 indicate that assumption is violated. But it
24 starts with the -- with the goodness of fit of
25 the model itself.

1 Q. Okay.

2 Are you aware of any source in
3 economics that indicates that it's a reliable
4 way to test for the IIA assumption to do the
5 kind of regression that you did?

6 A. Let me hear it back. I'm sorry.

7 Q. Are you aware of any source in
8 economics that indicates that doing the
9 regression that you did is an appropriate and
10 reliable way to test for whether the IIA
11 assumption is met?

12 A. I don't know if -- if I can point
13 you, sitting here, to an economic source for
14 that proposition, but what -- what economics
15 counsels is that to determine whether a model
16 is appropriate, you need good economic
17 foundation and you need a goodness of fit in
18 the data.

19 And then finally, what I did is I
20 tried alternative specifications. I don't
21 think there's anything else that we can do.

22 Q. Okay.

23 Are you aware of any source in
24 economics that goodness of fit is an
25 appropriate way to test for the IIA

1 assumption?

2 A. No. The way that the economics will
3 tell you is that goodness of fit will tell you
4 if the Logit is a -- is a -- is the relevant
5 way to describe preferences in substitution
6 patterns here.

7 Now, IIA is lurking in the
8 background of all of that.

9 Q. Right.

10 But you're not aware of any source
11 in economics that goodness of fit is an
12 appropriate way to test for the IIA assumption
13 directly?

14 MS. GIULIANELLI: Objection to the
15 form.

16 THE WITNESS: I think that if you
17 go into the economic literature and you see
18 the vast application of Logit in antitrust,
19 mergers in particular, I think that for an
20 economist or an agency, or an agency's
21 economist to feel good about using Logit, what
22 they care most about is whether the categories
23 were constructed intelligently and with a good
24 grounding in economics and in -- in record
25 evidence.

ATTORNEYS' EYES ONLY

Page 107

1 And so that -- that is how I
2 think -- and then finally the goodness of fit
3 of the model itself. I feel like that's the
4 way that an economist would counsel the choice
5 in the demand system.

6 BY MR. RAPHAEL:

7 Q. And one of the things you pointed to
8 with respect to your Logit model is the
9 negative sign in the regression that you
10 conducted; right?

11 A. That's -- that's right. That's
12 telling us that within the category, that all
13 things equal, controlling for all the other
14 things that we've controlled for in the -- in
15 the regression, that the higher the price of
16 that app, the lower its predicted market
17 share.

18 Q. Right.

19 Your regression correlates the
20 independent variable, which is the price, with
21 the dependent variable, which is the share of
22 the category?

23 A. Controlling for all of the things,
24 including app fixed effects and the like.

25 Q. Right.

ATTORNEYS' EYES ONLY

Page 113

1 certainly looked at it. It's a -- it is -- it
2 is something that is nice to have, and it
3 turned out that it works well here, and so --
4 but it's not dispositive. It's just one of
5 those things that are nice to have.

6 Q. Right.

7 The R-squared in your regression
8 is not dispositive of whether the Logit model
9 is doing a good job?

10 A. Well, I think that it's just one
11 piece of evidence among several that are all
12 pointing in the same direction. So I want
13 to -- I want to note it, I want to note that
14 hey, we're explaining over 85 percent, or
15 whatever it is, the variation in shares within
16 a category over and above that which can be
17 predicted by the mean shares alone, with
18 these -- with these independent variables that
19 it's doing -- that's a high R-squared.

20 Q. But the R-squared is measuring the
21 correlation between the independent variable
22 and the fixed effects with the share; right?

23 A. The R-squared is -- is a measure of
24 the totality of the model, so it's all the
25 variables combined.

ATTORNEYS' EYES ONLY

Page 114

1 Q. And are you familiar with the
2 over-fit problem with regressions?

3 A. Yes. You can over-fit a regression
4 if you include too many variables, that's
5 right.

6 Q. Right.

7 And choosing a set of variables --
8 choosing a set of explanatory variables based
9 on the size of the R-squared can lead to
10 nonsensical results?

11 A. Right. I would not allow R-squared
12 to, by itself, dictate the choice in model
13 selection.

14 So again, to repeat, the fact that
15 R-squared was high here was a nice thing, it
16 was worth mentioning, but it wasn't
17 dispositive.

18 Q. And other than the R-squared being
19 high, what were the indicators that led you to
20 decide that the Logit model was a good fit?

21 A. And I feel like we've been through
22 this, but I'm happy to go back through. We
23 start with, you know, were the categories
24 economically meaningful.

25 Q. Right.

ATTORNEYS' EYES ONLY

Page 115

1 A. And -- and we -- we know that Google
2 designed the categories. And then we also
3 know that developers selected into these
4 categories, so that tells you right off the
5 bat that there's significant economic meaning
6 to these categories; they're not just thrown
7 together in a haphazard fashion.

8 And then the next thing I want to
9 look at is whether, within a category, we get
10 the expected sign on the price coefficient and
11 whether it's statistically significant.

12 I also look at R-squared, but then
13 finally, to kick the tires, we want to make
14 sure that there is not an alternative demand
15 system that does a better job in explaining
16 substitution patterns, right?

17 So we tried other demand systems.
18 And we found that attached to each one of
19 those, as Dr. Leonard likes to point out,
20 attached to the linear is the 50 percent
21 pass-through rule. I'll just tell you, if the
22 linear had fit the data better, then my
23 pass-through would be 50 percent. I'm just
24 going to go wherever the data takes me.

25 Q. Did you -- which other demand systems

ATTORNEYS' EYES ONLY

Page 116

1 did you consider besides Logit at the time of
2 your opening report?

3 A. I considered linear and I also
4 considered but did not rely on the constant
5 elasticity demand.

6 Q. Okay.

7 So you considered a constant
8 elasticity demand model, but you didn't put
9 that in your report or disclose the backup to
10 us?

11 MS. GIULIANELLI: And I'm just
12 going to object pursuant to the expert
13 stipulation --

14 MR. RAPHAEL: Well --

15 MS. GIULIANELLI: -- that the
16 questions --

17 MR. RAPHAEL: -- I'll ask it
18 differently.

19 MS. GIULIANELLI: -- have to be
20 about what he relied on.

21 MR. RAPHAEL: Understood.

22 BY MR. RAPHAEL:

23 Q. So you are not relying on any test of
24 a constant elasticity model in this case?

25 A. I'm not relying on it, but I'm

ATTORNEYS' EYES ONLY

Page 117

1 telling you that I -- I ran that to ground; it
2 just didn't do well. And so --

3 (Overlapping Speakers.)

4 Q. But you didn't disclose that in your
5 reports?

6 A. Well, I --

7 MS. GIULIANELLI: Same objection.
8 Same objection. And I would just caution the
9 witness that to the extent that there is
10 something you did not rely on, it would be
11 privileged and -- and covered by the expert
12 stipulation.

13 THE WITNESS: Well, I certainly
14 did not rely on the constant elasticity. I
15 didn't rely on linear, but the reason why
16 linear came up is because your expert offered
17 it as an alternative and said hey, if Singer
18 had gone with linear, you know, the
19 pass-through would have dropped from 90 to 50
20 and look what happens, damages fall by a lot.
21 Well, yes, because pass-through is an
22 important element of damages.

23 But for him to be right, linear
24 would have to be a -- a -- do a good job or a
25 better job of explaining the data, and linear

ATTORNEYS' EYES ONLY

Page 120

1 on developers until fairly recently in the
2 database. So -- and -- and Google announced
3 that the reason why they were withdrawing the
4 restriction was at the behest of developers;
5 that is, developers wanted to get off 99,
6 which suggests that there's nothing special in
7 the developers' mind about 99. They -- they
8 want to be able to have the flexibility to go
9 down or up if -- if the demand dictated that.

10 BY MR. RAPHAEL:

11 Q. Is it your testimony that Google
12 required prices to end in 99 cents?

13 A. For -- for -- for at least certain --
14 yes, they -- I believe that you couldn't go
15 below 99. There was a 99 percent -- 99 cent
16 restriction --

17 Q. Right.

18 A. -- that a lot of developers were at,
19 and Google only recently took it down. And
20 Google said that the reason why they took it
21 down was -- was to satisfy the demands of
22 developers.

23 I also note that Apple imposed an
24 even, I want to say even more rigid, is that
25 proper, a more rigid structure than -- than

ATTORNEYS' EYES ONLY

Page 121

1 Google in that they had 99 tiers going up the
2 board. And to the extent that a developer
3 was -- was pricing on both Apple and Google,
4 that could cause the developer to reveal a
5 price that ended in 99 and was also
6 artificially constrained by -- by the Play
7 Store -- by the App Store.

8 Q. Is focal point pricing important for
9 understanding how developers set prices?

10 A. Important is -- is kind of a loaded
11 term, so I'll just say that we see a lot of
12 prices ending at 9, but we also know that some
13 of that is an artifact of the rules of the --
14 of the Play Store, of the App Store, so I'll
15 leave it at that.

16 Q. What percentage of developers set
17 their prices below 99 -- or at 99 cents or
18 below?

19 A. Oh, well, I've looked into what
20 happened when Google released them from the
21 strictures of the 99 cent rule, and we see a
22 lot, I think it was 40 percent, I'm going by
23 memory here, but you see a lot of app
24 developers who were at 99, and then you look
25 in that year, after Google released the

1 restrictions, you see a lot of them coming
2 down below 99.

3 Q. Is focal point pricing a reason why a
4 developer might not reduce prices if Google
5 reduced service fees?

6 A. I mean, it could be under -- under
7 very extenuating circumstances that I've
8 spelled out at the very end of my Merits
9 report, but -- but here, I think that the
10 prospect of focal point pricing getting in the
11 way, even for those who care about it, of a --
12 of a price reduction is -- is remote and --
13 and -- and that's largely because of how big
14 the delta is between the actual take rate and
15 the but-for take rate. You have a -- a
16 tremendous savings that's going to be enjoyed
17 by each of these developers in the but-for
18 world. And just profit considerations are
19 going to dictate that they come down.

20 Now, when they come down, they
21 don't have to necessarily end in a number
22 other than 9, and I -- and so what I've done
23 in that section is I go through and I say
24 let's constrain everyone to end at a 9, and I
25 calculate, like, the share of developers that

ATTORNEYS' EYES ONLY

Page 123

1 would -- that would somehow not move, and it's
2 something below a half a percent. It's de
3 minimus.

4 Q. Right. So let's -- let's look at
5 that. That's page 203 of your opening Merits
6 report.

7 A. Okay.

8 Q. And this is Table 17.

9 A. Yes.

10 Q. So you find there that some non-zero
11 amount of developers would not reduce their
12 prices if they were committed to having their
13 prices end in 9; isn't that right?

14 A. Correct.

15 Q. Do you know how many developers
16 that -- that amounts to?

17 A. Sitting here, I don't, but it's --
18 should be easy to figure out the backup.

19 Q. Did you run a version of this table
20 in your reports with the assumption that
21 developers would want to set prices ending in
22 99?

23 A. I did not.

24 Q. Okay.

25 And do you know the percentage of

ATTORNEYS' EYES ONLY

Page 133

1 if we're looking -- if we're looking at price
2 effects, you know, between 2016 and 2020.
3 We're going to be touching a hundred percent
4 of the developers' revenues.

5 I mean, just so many things went
6 wrong with this experiment, many of which are
7 not Dr. Leonard's fault. It's just that --
8 it's just the hand that he was dealt. It just
9 doesn't provide a fruitful environment to
10 explore and exploit these take rate
11 reductions.

12 Q. You re-ran Dr. Leonard's analysis
13 using prices adjusted for inflation; right?

14 A. Right. And, you know, when you're
15 looking for price reductions in an
16 inflationary environment and you just see
17 flat-lining, it suggests that that can be
18 interpreted as a price increase.

19 Q. Right.

20 In an inflationary environment
21 where a price stays the same, you can
22 interpret that as a price decrease?

23 A. Correct. Another -- put differently,
24 if you're trying to test the impact of a take
25 rate reduction, and all the sudden, prices

ATTORNEYS' EYES ONLY

Page 134

1 start shooting through the roof, that could
2 conflate inferences that you would otherwise
3 be able to make in a -- in a more controlled
4 experiment.

5 Q. Right.

6 So if Google kept its service fees
7 the same during an inflationary period, should
8 we interpret that as a reduction in Google's
9 service fees?

10 A. Not necessarily, because Google is
11 making more revenue when the app price revenue
12 goes up, right? Google is keeping 30 percent
13 of all revenues generated. And to the extent
14 that inflation was putting upward pressure on
15 app prices, I think that's going to redound to
16 the benefit of Google.

17 Q. So when developers keep their prices
18 the same during an inflationary period, they
19 are reducing their prices, but when Google
20 keeps its prices the same during an
21 inflationary period, it's not?

22 A. No, because Google sets a very
23 particular price, right? Google's price is a
24 tax. So Google doesn't need to -- Google
25 doesn't need to raise its tax rate in order to

ATTORNEYS' EYES ONLY

Page 146

1 variation on the right-hand side.

2 Q. And how about in your Logit model;
3 did you use the percentage rate or did you use
4 the gross amount of the change in marginal
5 cost?

6 A. Remember, the Logit model, you're
7 doing -- the apps share within the category on
8 its price.

9 Q. Okay.

10 A. Yes, so I just don't think that that
11 question gets at what we did in the Logit
12 model. That's possible.

13 Q. That's okay.

14 I think we've covered this before,
15 but I just want to make sure the record is
16 clear.

17 A change in an ad valorem fee will
18 affect prices proportional to other marginal
19 costs?

20 MS. GIULIANELLI: Objection to the
21 form.

22 THE WITNESS: We have covered it
23 before in my first deposition, and you pointed
24 me to an equation, the Lerner index, which
25 would suggest that that could be the case if

ATTORNEYS' EYES ONLY

Page 147

1 you tried to do the derivative in your head.

2 I think that when you look at the
3 traditional models of pass-through, which,
4 remember, are a derivative of the -- if you
5 think of it as a derivative of the Lerner
6 index, it's -- it's looking at how the profit
7 maximizing price changes in response to a
8 change in cost.

9 And then you look at the most
10 common functional forms. You'll often see
11 that marginal cost drops out of the
12 pass-through equation.

13 BY MR. RAPHAEL:

14 Q. Well, does it drop out when you're
15 looking at an ad valorem cost?

16 A. In this case, it drops out of the
17 pass-through equation, yes.

18 Q. Okay.

19 And can the amount of a
20 developer's marginal cost, other than the
21 service fee, affect the amount of
22 pass-through?

23 A. Not under the Logit model that I'm
24 using. It's conceivable it could in others,
25 but in my Logit model -- not -- in the Logit

ATTORNEYS' EYES ONLY

Page 150

1 The most -- I mean, the most
2 obvious one would be processing fees. But
3 there are other marginal costs, royalty fees
4 that they pay, but -- but I haven't estimated
5 those at the developer level.

6 Q. One of the inputs into your
7 pass-through model is Google's market share in
8 a world without the challenged conduct.

9 A. Not in the pass-through model. Did
10 you mean to say -- it certainly -- Google's
11 market share is in Rochet-Triole and it's in
12 Landes-Posner.

13 Q. Yes. One of your inputs into
14 calculating what Google's but-for service fee
15 would be is Google's market share in the
16 but-for world.

17 A. Correct.

18 Q. And you estimated that share to be 60
19 percent; right?

20 A. I -- I used as an input the
21 60 percent because that's the best that the
22 economic literature in busting up monopolies
23 can -- can give to us.

24 I also, you know, would note --
25 yes, that is -- that is the best estimate that

ATTORNEYS' EYES ONLY

Page 151

1 I could find in the literature.

2 Q. Okay.

3 And that market share estimate is
4 based on an article that attempted to estimate
5 AT&T's market share in the longest in its
6 telephone market in the 1980s?

7 A. Yes, with one important caveat that
8 you left out, which was after AT&T's
9 anti-competitive tie was unwound, right?

10 What I -- what I was looking for
11 was the closest analogue in antitrust history
12 in which a dominant firm that had extended its
13 leverage from one market into another was
14 forced to unbundle or break apart the tie.
15 There aren't a lot of such episodes, right, in
16 the history of antitrust for reasons that we
17 could describe -- discuss over coffee, but we,
18 in any event, it's a network industry; it's
19 the monopoly, where the tie gets removed.
20 It's been studied ad nauseam by economists
21 for -- for the price effects that can be
22 attributable. And so I thought that
23 60 percent was the best estimate.

24 And in any event, it turns out
25 my -- my in-app model for damages is not that

ATTORNEYS' EYES ONLY

Page 152

1 sensitive to the 60; that is, as you put in
2 different inputs for 60, you go to 70 or if
3 you think that Google share would have fallen
4 to 50, it just turns out that the model is not
5 that sensitive to that input.

6 Q. Well, do you disagree that if
7 Google's but-for market share is 75 percent,
8 that your damages figure falls by over
9 40 percent?

10 A. No, it wouldn't. It would not.

11 So you're saying if all you did --
12 see, what -- what Dr. Leonard, respectfully,
13 did was that he kept changing two parameters
14 at a time. He kept changing the but-for share
15 and the actual share. If he held everything
16 constant for Landes-Posner, if you change just
17 the but-for share, say, by 10 percentage
18 points, you get, depending on which direction
19 you go, you get something on the order of a 5
20 percentage point swing in damages.

21 And so what -- what that's telling
22 you is that the input is important, but the
23 results don't vary significantly, or let's
24 just say the results aren't amplified based on
25 the change in this input; that they're, in

ATTORNEYS' EYES ONLY

Page 153

1 fact, they -- they are -- they are reduced,
2 right, because you go with a 10 percentage
3 point change, you get a much, much smaller
4 change in damages.

5 Q. Did you look at any firms in any
6 competitive markets that benefit from network
7 effects to see what their share was?

8 A. Oh, sure. Remember I -- I looked at
9 a whole host of -- of industries in which case
10 a leader lost share, including in network
11 industries. I think Netflix may have been one
12 of them.

13 But I -- I looked at -- I looked
14 at as much -- as much literature as I could
15 find on this issue of network industries, you
16 know, where a leader loses share, and I felt
17 that there are a lot of reasons why a leader
18 can lose share, right? It could just be
19 because the market was contestable.

20 But -- but I felt that it was
21 really important to be able to exploit an
22 episode in history in which a dominant firm
23 lost its grip on a tied market because the --
24 because the government told it that it could
25 no longer engage in the tie. I felt that that

ATTORNEYS' EYES ONLY

Page 154

1 was about as close as you could get to what
2 we're trying to get at here.

3 Q. What is Microsoft's current share in
4 operating systems for PCs?

5 A. Well, that wasn't the tied market, of
6 course. I think the more relevant --

7 Q. Well, wasn't tying at issue in
8 Microsoft?

9 A. It absolutely --

10 MS. GIULIANELLI: Objection to the
11 form of the question.

12 THE WITNESS: It absolutely was,
13 but that wasn't the tied market, as Karma
14 knows. The tied market there was the browser.
15 And so what I looked at was the browser share
16 and the browser share disappeared.

17 So if you really want me to use
18 the Microsoft example, I'm happy to, but it's
19 going to cause damages to be much, much bigger
20 than the one that -- that I went with.

21 BY MR. RAPHAEL:

22 Q. Did you use the 60 percent market
23 share as an input into the single take rate
24 model?

25 A. I believe we needed input, you asked

ATTORNEYS' EYES ONLY

Page 163

1 opting in and participating in a loyalty
2 program, and if the benefits for doing so are
3 paltry, that could affect how many people take
4 advantage of the program.

5 Q. Right.

6 There are costs to opting into a
7 rewards program; right?

8 A. Yes.

9 Q. Okay.

10 And in the -- in your Play Points
11 damages model, you assume that all Play Store
12 users would have signed up for the Play Points
13 program?

14 A. No.

15 Q. You don't?

16 A. No, not necessarily. What I'm trying
17 to solve for is the extent of a subsidy that
18 Google would have offered across -- in the
19 aggregate across all users, but I don't think
20 that I'm necessarily assuming that each user
21 avails itself. It's possible that it would,
22 but my -- my damages model for aggregate
23 damages is looking at the savings to the class
24 if Google were to be more generous in its
25 subsidy program.

ATTORNEYS' EYES ONLY

Page 164

1 Q. Your Play Points model measures the
2 damages that consumers would have incurred in
3 the aggregate?

4 MS. GIULIANELLI: Objection to the
5 form.

6 THE WITNESS: I think that my
7 model is being offered for an estimate of
8 aggregate damages, among other things; I think
9 it also speaks to injury and impact. But I --
10 I -- I believe that that -- that -- that
11 parameter that comes out that we're interested
12 in, which is the price on the consumer side of
13 the market, is telling you across all
14 consumers, this is -- this is what -- what --
15 what Google will pay.

16 BY MR. RAPHAEL:

17 Q. Does your Play Points model tell the
18 jury how much a user who did not sign up for
19 Play Points in the actual world was damaged?

20 A. You could estimate, for a given
21 member of the class, you could estimate what
22 the reduction in -- in his or her net payments
23 would be relative to what they spent in the
24 actual world. And you wouldn't abandon that
25 exercise simply because they didn't use Play

1 Points in the real world. In the real world,
2 the reason why most people or many people
3 didn't use it is because Google was so skimpy
4 with the offering.

5 In a but-for world in which Google
6 is forced through competition to employ a more
7 generous points model, including making the
8 enrollment easier, they'd -- they'd be forced
9 to. Under -- in a competitive market, it
10 would be reasonable to assume that -- that
11 most, if not all, consumers in the class
12 would -- would partake and -- and take
13 advantage of that -- of that program.

14 Q. Are you offering the opinion that all
15 users in the but-for world would have signed
16 up for the Google Play Points program?

17 A. Economists tend to be reluctant to
18 say all, like do I know with certainty or to a
19 reasonable certainty that every single class
20 member signs up? I don't know if the model
21 can tell us that.

22 What the model is telling us is
23 what's the -- what is the aggregate or average
24 subsidy that Google offers. And I think that
25 it is reasonable to infer that if the subsidy

ATTORNEYS' EYES ONLY

Page 166

1 gets sufficiently large such that it is a
2 meaningful reward, that most, if not all,
3 consumers will take advantage of it in the
4 but-for world.

5 Q. Have you estimated what portion of
6 users would have signed up for the Play Points
7 program in the but-for world?

8 A. I feel like that question is no
9 different from the -- from the last.

10 I have not given an empirical
11 estimate of the proportion. I think it's very
12 high, it could be close to 100 percent, but
13 there's no requirement that it's a hundred
14 percent for the model to -- to hold.

15 Q. If I were to come to you with a user
16 chosen at random from the data that you've
17 looked at of people that used the Google Play
18 Store, could your model tell me whether that
19 user would have signed up for the Google Play
20 Points program in the but-for world?

21 A. I don't think the model tells you
22 whether a user will sign, but what the model
23 can tell you is what the subsidy, what the
24 predicted subsidy would be for that user. And
25 if the subsidy is as large as these models are

ATTORNEYS' EYES ONLY

Page 167

1 implying, whether it's the Rochet-Triole model
2 or the Amazon model, these are big numbers;
3 we're talking about ■■■ to ■■■ percent savings.

4 It seems like a safe inference is
5 that if a -- if Google wants to credit you
6 between ■■■ and ■■■ percent, I'm going by
7 memory, of the -- of the price of partaking in
8 all the fun of its Play Store, that most, if
9 not all, consumers will avail themselves of
10 that option.

11 Q. Have you calculated the minimum value
12 of the Play Points subsidy that would be
13 necessary to get any consumer to sign up for
14 Play Points?

15 A. I haven't calculated it down to the
16 decimal, but my opinion is this; that in the
17 actual world, with a -- with a paltry subsidy
18 of ■■■■■ percent, you see many people not
19 availing themselves of the option.

20 In a but-for world where the
21 subsidy is in the order of ■■■ to ■■■ percent,
22 if we -- if Google matches Amazon, I think a
23 safe inference is that all or almost all
24 consumers will avail themselves of that
25 option.

ATTORNEYS' EYES ONLY

Page 168

1 Q. Well, your Play Points model, though,
2 is about the percentage of the price that
3 would be credited back to consumers, not the
4 percentage of Google's revenue; right?

5 A. Oh, no, no, no. Hold on. We're on
6 the same page, I think. It's the percentage
7 of the price from the consumer's perspective;
8 right?

9 Q. Right.

10 A. And so if -- if in a but-for world,
11 Google takes its subsidy from, say, [REDACTED]
12 percent to [REDACTED] percent, right, that is a
13 material change in the terms of the program,
14 at which point you're looking at all your
15 friends who are getting [REDACTED] percent off and you
16 say hey, sign me up, I'll take some of that,
17 too.

18 Q. Right.

19 Have you calculated the percentage
20 credit on the price that would be necessary
21 for any consumer to find it worth it to
22 overcome the cost of signing up and sign up
23 for the Play Points program?

24 A. I haven't calculated the percentage,
25 but I will say that in a but-for world where

ATTORNEYS' EYES ONLY

Page 169

1 Google is going head-to-head with a -- with a
2 competitor who is competing on this dimension,
3 whether it's Amazon or Facebook or Samsung,
4 that Google would make sure that whatever
5 enrollment costs there were, they would not be
6 so prohibitive as to allow that rival to eat
7 their lunch.

8 Q. Have you done any analysis of the
9 elasticity of demand for the Play Points
10 program?

11 A. I have done elasticity of demand of
12 consumers with respect to pricing in the App
13 Store. So to the extent that Play Points or
14 any subsidy changes pricing, you could figure
15 out what the sensitivity would be.

16 Q. But you haven't tested whether what
17 happens when Google changes its Play Points
18 subsidy and how that affects whether people
19 sign up for the Play Store -- for the Play
20 Points program; you haven't done that?

21 A. Well, it's a bit of a trick question
22 here, because Google has been at -- at this
23 paltry [REDACTED] percent, you know, since the advent
24 at least in the U.S.

25 Now, there are some experiments

ATTORNEYS' EYES ONLY

Page 170

1 that you might be able to look at. In Korea
2 and Japan, I think that Google tried to meet
3 the limited competition that -- that occurred
4 there with an increase in the subsidy. But I
5 haven't studied -- I haven't studied what the
6 reaction would be.

7 I think it's safe to infer that
8 Google felt, and this is just kind of basic
9 economics, that Google felt compelled to meet
10 the competition because they feared that if
11 they didn't -- if they weren't competitive on
12 that dimension, they would lose customers.

13 Q. Your Play Points model also uses the
14 elasticity of demand from an article about
15 AT&T long distance in the 1980s?

16 A. That's of the rival elasticity,
17 that's right.

18 Q. Right.

19 And that's drawn from the same
20 article as the article where you got the
21 but-for share for Google; right?

22 A. Correct.

23 Q. And you didn't calculate the
24 elasticity of demand in the but-for world
25 yourself?

ATTORNEYS' EYES ONLY

Page 171

1 A. Well, this is -- remember what we're
2 talking about is the rival supply elasticity.
3 So Google by the tie doesn't allow any rival
4 to enter and expand, and now you're asking me
5 where's your -- where's your model, Singer,
6 for how PayPal or Stripe, you know, would have
7 responded to an increase in Google's price.
8 They couldn't come in by virtue of the tie.

9 So I don't think that -- that
10 life, by virtue of Google's restrictions and
11 the challenged conduct here, is going to allow
12 us to test for rival supply elasticity
13 particularly in the but-for world.

14 Q. You didn't present your Amazon Coin
15 damages model at the class certification
16 stage?

17 A. That's correct.

18 Q. Why not?

19 A. I don't think that I had data at
20 that -- at that time to estimate Amazon's
21 subsidy.

22 Q. And your Amazon Coins damages model
23 is used for calculating aggregate damages?

24 MS. GIULIANELLI: Objection to the
25 form.

ATTORNEYS' EYES ONLY

Page 172

1 THE WITNESS: Correct. That --
2 that's fair, among other things. But I think
3 that the primary purpose here, now that we're
4 at the merits, is what the -- what aggregate
5 damages are.

6 BY MR. RAPHAEL:

7 Q. And if I -- again, if I took a user
8 at random from the -- from the data on the
9 users of the Google Play Store, could your
10 Amazon Coins model tell me whether -- how much
11 in subsidy that consumer would have received?

12 A. Yes.

13 Q. And could it tell -- and -- and is
14 your idea that the subsidies in your Amazon
15 Coins model would have been part of a program
16 that all users would have signed up for?

17 A. I think that once you get into the
18 [REDACTED] percent range, I think that it would be
19 irrational and illogical for a consumer to
20 pass up that savings. They would figure out a
21 way to get enrolled.

22 Q. Okay.

23 But you -- again, you haven't
24 studied, with respect to your Amazon Coins
25 model, the percentage of savings that would be

ATTORNEYS' EYES ONLY

Page 180

1 models and I think they're both reasonable.

2 Q. So you can't say whether it's more
3 reliable for the -- to estimate damages at the
4 [REDACTED] that you have for the
5 Amazon Coins model or the [REDACTED]
6 that you have for the Play Points model?

7 A. No. And you keep -- you keep going
8 back to the difference in the magnitude.
9 That's just because we have such a large base
10 of spending.

11 What we're really trying to figure
12 out is as we toggle between the [REDACTED] percent of
13 the Play Points and [REDACTED] percent, which is about
14 [REDACTED] percentage points, should we -- should we
15 credit Google with an incumbency advantage or
16 should we not.

17 I think there are legitimate
18 arguments that would suggest that if entry by
19 a rival were to occur early enough in the
20 place for experience, then it would be -- it
21 would be too charitable to Google to credit it
22 with an incumbency advantage, right? If
23 Google were facing a rival right out of the
24 gate, right, what's the source of its -- of
25 its incumbency advantage?

ATTORNEYS' EYES ONLY

Page 181

1 Q. Have you formed an opinion as to
2 which of the numerous different damages models
3 that you have is the most reliable one for the
4 jury in this case?

5 A. I think it's -- it's hard to compare
6 models that are meant to do different things,
7 right? We've got some models that are meant
8 to -- to come up with but-for take rates and
9 pass-through in the -- in the primary market.
10 We've got a different model that's meant to
11 predict the but-for take rate in the
12 aftermarket.

13 I don't know how one would say
14 that one is better than the other. I feel
15 like these are the best that economics has to
16 offer for each of the -- each of the problems
17 that I've been given.

18 Q. Did you consider using any other App
19 Store as a benchmark for your subsidy model
20 rather than the Amazon App Store?

21 A. It's -- it's certainly possible I
22 considered. One -- one problem that I had,
23 for example, with the ONE Store is that the
24 ONE Store is competing along both dimensions.
25 I think they took their take rate down and

ATTORNEYS' EYES ONLY

Page 182

1 they did a more generous subsidy program. And
2 remember, in this -- when we go down this
3 branch of the tree, we're thinking about
4 competition that only occurs on one dimension;
5 namely, take rate.

6 And the second thing that -- that
7 worried me about ONE Store is that it's --
8 it's specific to Korea and Amazon was -- was
9 global. And so I felt that -- that we just
10 didn't have as good of a benchmark as Amazon
11 for -- for that parameter.

12 Q. Okay.

13 A. Oh, there's one more reason, too, is
14 that I don't think we have the magnitude of
15 ONE Store's subsidy. We have the dollar
16 amount, I found press articles that said it's
17 X hundreds of millions of dollars, but I --
18 I -- I wasn't able to -- to generate a -- a
19 subsidy in terms of percent of spend for ONE
20 Store.

21 Q. Okay.

22 MS. GIULIANELLI: Pretty soon we
23 can take a break for lunch.

24 MR. RAPHAEL: Sure.

25 BY MR. RAPHAEL:

ATTORNEYS' EYES ONLY

Page 183

1 Q. Did you -- did you analyze whether
2 any of the benchmark App Stores in Table 7
3 offer subsidies and whether you could use
4 those as benchmarks?

5 A. I did not.

6 Q. Okay.

7 Just a couple more questions and
8 we can take a break for lunch.

9 A. Okay.

10 Q. Now, users sign up for Play Points
11 and then they earn points when they make
12 purchases; right?

13 A. Correct.

14 Q. And Amazon Coins have to be purchased
15 separately?

16 A. Correct.

17 Q. Did you consider whether that
18 difference could affect whether the Amazon
19 Coins program is a proper benchmark?

20 A. I certainly considered it, and I just
21 want to make clear that in my -- in my but-for
22 world under this model, I am not positing that
23 Google mimics Amazon's program verbatim,
24 right. I recognize there are differences in
25 the program.

ATTORNEYS' EYES ONLY

Page 187

1 A. Close. It's just -- yeah, the share
2 of that developer within its category, that's
3 right, its market share.

4 Q. Right.

5 And so what the regression is
6 looking at is if the developer changes its
7 price, does that reduce its share of the app
8 category; right?

9 A. Right. Implying that -- that there
10 would be substitution away from that app
11 towards what consumers perceive to be
12 substitutes.

13 Q. Right.

14 And does the regression that you
15 ran that looks at the change in price and its
16 effect on the developer's share of its
17 category tell you anything about where the
18 substitution, as you put it, comes from?

19 A. Where it comes from is, of course,
20 the app who is raising the price. Did you
21 mean to say where it's going? I don't --
22 where it's coming from --

23 Q. Ah, thank you for that.

24 A. Okay.

25 Q. I'll ask a better question.

ATTORNEYS' EYES ONLY

Page 188

1 A. Okay.

2 Q. So your regression that you ran in
3 connection with your Logit model, does it tell
4 you where, when a developer raises its price,
5 where consumers will substitute to within the
6 category?

7 A. This -- this particular model, or at
8 least for this purpose of a model, or this
9 stage of the model, it is simply telling you
10 that the developer loses share. But once you
11 know that the model fits and is the best
12 demand system for the data, you can infer that
13 users are moving around the category in
14 proportion to the market share of the -- of
15 the other goods.

16 Q. Okay.

17 But the regression is one of the
18 things you used to determine the fit of the
19 model; right?

20 A. Correct.

21 Q. Okay.

22 And the regression, itself, does
23 not tell you when a developer raises its price
24 or lowers its price, I guess, to which apps do
25 the other -- do the consumers substitute;

ATTORNEYS' EYES ONLY

Page 189

1 right? It doesn't tell you that?

2 A. Correct.

3 Q. Do you agree that the relevant
4 product market should include all competitive
5 constraints?

6 A. No.

7 Q. Is product quality --

8 A. Can I -- also, can I just say why? I
9 mean I --

10 Q. Sure.

11 A. Just to be clear, you don't need to
12 include all competitive constraints because
13 there could be some very weak constraints that
14 don't prevent the exercise of market power.

15 So if the guidelines are telling
16 you to include only those that are necessary
17 in order to effectuate a price increase over
18 competitive levels, so that was the only part
19 I was pushing back on.

20 It's not all competitive
21 constraints, right? It's not every one under
22 the sun. And maybe we could define what you
23 mean by competitive. But -- but I took it to
24 mean literally any competitive including weak,
25 right? We don't need weak constraints to be

ATTORNEYS' EYES ONLY

Page 417

1 across consumers. But I never make a forecast
2 in a but-for world of what a consumer would
3 choose, for example, if one of the options
4 were taken away, or if one of the prices were
5 higher. That's not the purpose.

6 So I think you might be
7 misunderstanding the purpose of my model.

8 My -- the purpose is to confirm
9 that the Logit does the best job explaining
10 the substitution patterns of the data. And
11 once we know that, once it fits, once we try
12 Linear, once we try constant elasticity, once
13 we determine that Logit is the best, then we
14 say, okay, what does the literature tell us
15 about the implied pass-through rate if Logit
16 is the demand specification.

17 Q. I want to make sure we're super clear
18 and we'll -- we'll wrap up with this line, I
19 assure you.

20 A. Okay.

21 Q. I want to make sure we're really
22 clear about this, so I'm going to take you
23 step by step.

24 Okay. You've used a Logit model
25 to model demand in this case; correct?

ATTORNEYS' EYES ONLY

Page 418

1 A. I have used a Logit model to assess
2 at demand choices across apps within a given
3 category, that's correct.

4 Q. Right.

5 And by doing that, what you are
6 trying to model are the substitution decisions
7 that consumers will make between apps in the
8 same category?

9 A. I'm really trying to figure out if
10 the parameter on price behaves as one predicts
11 under the Logit model; that is, all things
12 equal, if an app's price goes up, does it lose
13 market share to the rivals within its
14 category.

15 That's -- that's what I'm doing
16 with the Logit model.

17 Q. Okay.

18 And is it your testimony that what
19 Professor McFadden is discussing in this Nobel
20 Prize lecture where he says that it -- the
21 model can produce seriously misleading
22 forecasts if IIA fails, has nothing to do with
23 using the Logit model to assess if demand
24 choices, within a given set of products, are
25 modeled correctly?

ATTORNEYS' EYES ONLY

Page 419

1 MS. GIULIANELLI: Objection to the
2 form.

3 THE WITNESS: Yeah, I do think
4 we're speaking past each other. I think the
5 forecast that McFadden has in mind here are
6 forecasts that are made from the parameters of
7 the Logit model after it's estimated, right.
8 I'm not making any such forecast. That's not
9 what I'm using it for.

10 I'm trying to determine if, among
11 a set of standard assumptions on demand
12 shapes, does the Logit assumption best fit the
13 data. And if I can convince myself that it
14 does, and certainly none of your experts have
15 put anything in to suggest that there's a
16 better fit, then I feel confident in using the
17 pass-through rate under the Logit model.

18 But I'm not making any forecasts
19 based on the parameters that come out of the
20 Logit specification.

21 BY MR. RAPHAEL:

22 Q. And you think that's what McFadden is
23 discussing?

24 A. Yes.

25 Q. And your Logit model though is trying

ATTORNEYS' EYES ONLY

Page 420

1 to -- is trying to model the choices that
2 consumers make, isn't it?

3 MS. GIULIANELLI: Objection to the
4 form.

5 THE WITNESS: It's -- it's testing
6 a key assumption built into the Logit, which
7 is does a firm lose share when it raises
8 prices, all things equal, and I can -- I can
9 satisfy that test.

10 BY MR. RAPHAEL:

11 Q. I just want your clearest statement
12 of what forecast you think Professor McFadden
13 is describing in this article?

14 MS. GIULIANELLI: And I'm just
15 going to object to the extent that he's --
16 he's looking at, you know, one line right now.

17 THE WITNESS: Right.

18 MS. GIULIANELLI: But...

19 THE WITNESS: So -- so for me
20 to -- for me to give you a fully informed
21 decision, I probably would want to read other
22 paragraphs, surrounding text; I don't think we
23 have time for that.

24 But I think that I know this with
25 certainty, that he's not speaking of the

Exhibit F3

Public Redacted Version

FILED UNDER SEAL

Exhibit

13



Program Review: Apps Spend

larissa, marchak, rickysingla

October, 2015

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Notes on Methodology

Excludes China and Apple first party apps

- Consumer spend on iOS is about ~\$3.5B annually in China (92% is games)
- Apple first party apps deliver an additional ~\$2.6B (biggest apps are Pages, Numbers, and Keynote, biggest markets are US,CN)

Apps considered

- Education category is excluded in this analysis
- Apps that are on Android-only are excluded from the developer and category-level analysis
- Only included devs who have >\$1000/month spend on either Play or iOS
- Numbers have been annualized based on monthly average of last 3 months
- No manual verification of content gaps, data is a combination of Playfull and App Annie so some inaccuracies may persist

Gap definitions

- Content gap = apps are not on Play
- Policy gap = apps are on Play but not monetizing
- Performance gap = apps are on Play and monetizing

Market view

- User market has been used for this analysis

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Executive Summary

Apps spend is underperforming by \$5.8B when compared to iOS, performance gap is largest driver

- **Market share**
 - Play Apps spend = 15% total apps spend
 - Play Games spend = 43% total games spend
- **Business Diversity**
 - Play Spend is 10%/90% Apps/Games
 - iOS Spend is 33%/66% Apps/Games
- **Total Play Spend Gap for Apps \$5.8B vs. \$3.6B for Games**
 - \$2.3B Content* Gap - driven by Torso & Tail apps in Tools
 - \$1.1B Policy Gap - driven by Head apps in music, entertainment, and social
 - \$2.7B Performance Gap - driven by Head across all categories
 - Note: There are also a few apps that outperform on Play (~\$300M from apps like Line (\$150M), Kakao, etc.)
- **Market Impact: Global Apps Spend on iOS dominated by NA & EMEA, maps to largest Play gaps**
- **Tablet Impact: iPad Accounts for 25% of the gap**

Proposals to address the Gaps:

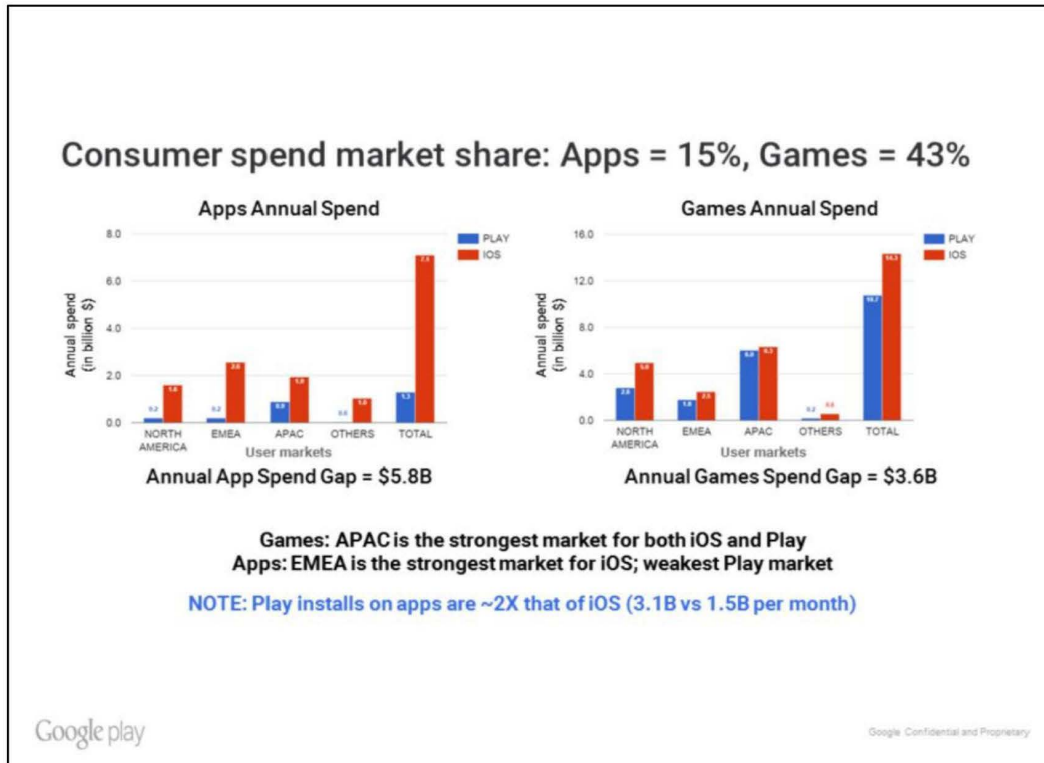
- Grow Scaled BD to close persistent Apps content gaps
- Enforce policies and require use of Play Billing for Apps IAP and Subscription services
- Direct & Scaled BD drive growth opportunities using data-driven tools to identify highest potential opportunities (Jarvis)

*Content gaps reflect apps that are not on Play - these may become Policy gaps if they were to build for the platform

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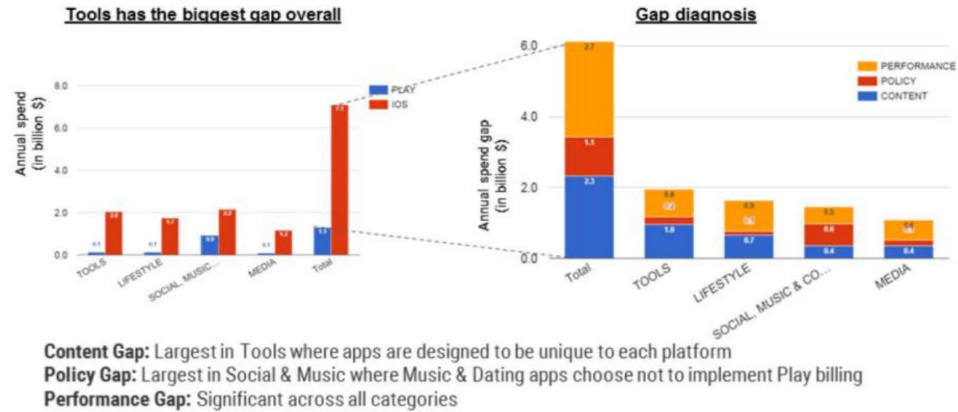
Surplus apps outperform iOS by 300M annually.. LINE contributes 150M out of that (50%)... next one is Kakao at 9M



LINE is 72% of APAC play apps spend. excluding LINE, play's markets share in APAC drops from 32% to 17%

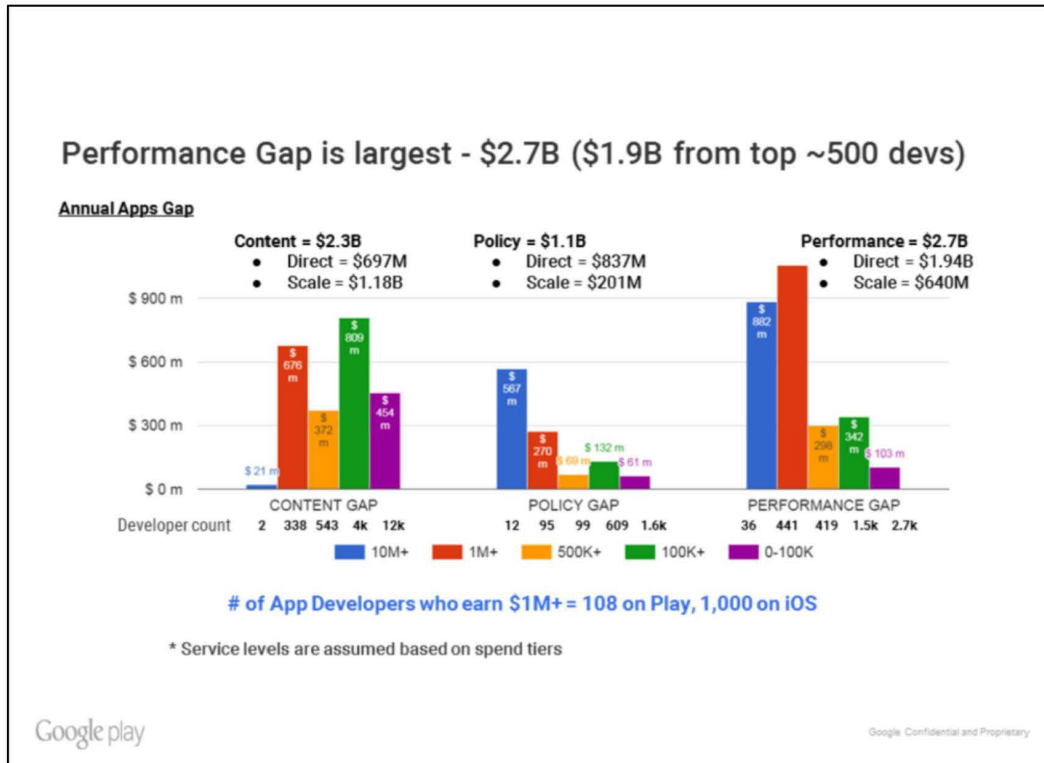
Others = 75% LATAM

All App Categories contribute to the Spend gap



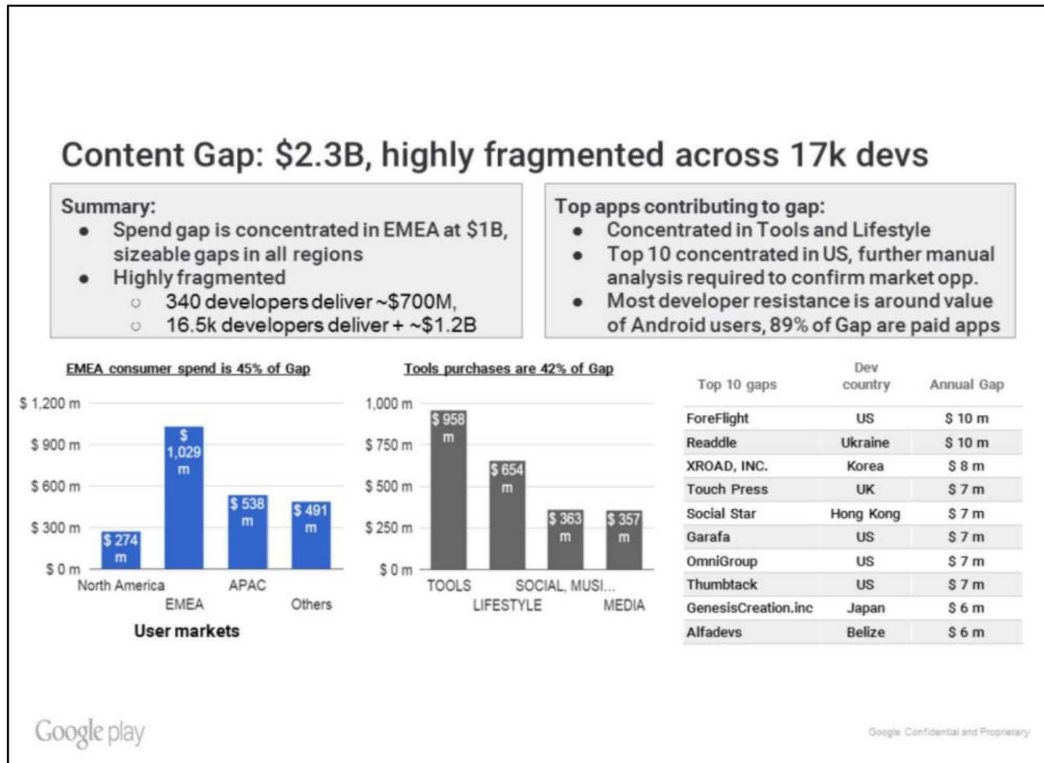
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Content = 340 missing developers deliver ~\$700M, 16.5k missing developers deliver ~\$1.2B
 → Torso & Tail
 Policy = 107 developers deliver ~\$800M, 2.3k developers deliver 201M → Head
 Performance = 36 developers deliver ~\$900M, the next 450 deliver 1.1B → Head

108 apps devs make 1M+ on play
 1000 devs make 1M+ on iOS



Of the top 10 missing spend apps, xx are based in yy market
 However, there are 300+ more developers making over \$1M on iOS - need to manually map their markets

ForeFlight -- Pilot flight planning and services, subscription apps
 Readdle - office suite, coming to Android, paid apps
 XROAD, INC. - navigation, paid app
 Touch Press - history & education, paid app
 Social Star - social network boosting, IAP packs for likes, followers
 Garafa - GPS, paid app
 OmniGroup - office suite, paid app
 Thumbtack - services marketplace, IAP credit purchasing from service providers
 GenesisCreation.inc - chat app, IAP
 Alfadevs - recently banned? music streamer and downloader, paid app

| Id | Date | Text |
|---|---------------------|---|
| 1 | 10/28/2015 17:20:22 | _Marked as resolved_ |
| 2 | 10/28/2015 17:20:31 | _Re-opened_ |
| 3 | 10/28/2015 17:23:31 | Sure: There are lots of tool devs (e.g. ClockworkMod, CyanogenMod) that build for custom ROMS, which are, inherently, an Android-only tool. Also cleaners, boosters & AntiVirus (e.g. from Liquidum, AVG Mobile) are Android-only |
| 1 | 10/28/2015 19:18:31 | How about launcher and widget-type Tools devs? Sent from Android device. |
| 2 | 10/28/2015 19:25:38 | We are looking for areas that are not applicable to android only |
| 1 | 10/28/2015 20:40:51 | +joecastorena@google.com +joeltnewman@google.com - do you have any examples of developers who build tools for only android platform and not for iOS.. |
| 4 | 10/28/2015 20:40:51 | I think you and BV might actually be able to pull this more easily systematically than I. The main tool devs that I work with are building tools that leverage Android-only functionality or build on both platforms. |
| <div>Google play</div> <div>Google Confidential and Proprietary</div> | | |

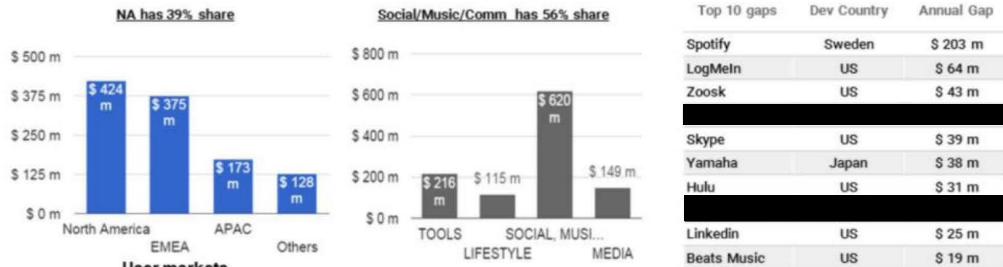
Policy Gap - \$1.1B with over 50% in Social & music

Summary:

- Spend gap concentrated in US & EMEA at \$800M, and Social & Music at \$620M
- Business needs drive decisions
 - Existing billing infrastructure lowers value of Play solution
 - Missing features prevent adoption

Top apps contributing to gap:

- Over 50% of gap is contained in Social & Music - 10 of 12 developers making \$10M+ on iOS and Spotify is 18% of total gap
- Another 95 developers make over \$1M on iOS

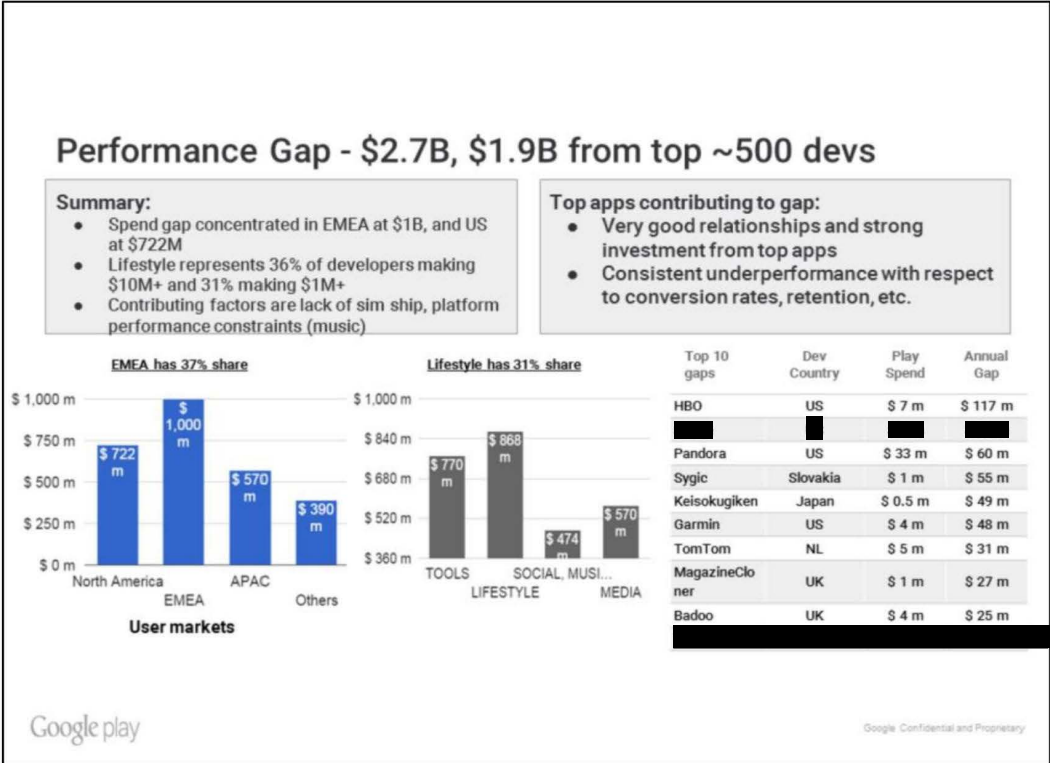


User markets

*Policy gaps reflect apps that are not using Play billing but do use iOS billing - there are business drivers of this decision like existing infrastructure, lack of key features, focus on ads for Android users, etc.

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- Launch delay
- Platform performance constraints
- Missing product features
- Add developer market contribution

Different BD approaches required for each Gap

Content = \$2.3B

- Direct = \$697M
- Scale = \$1.18B

Challenge: Content Gap is highly fragmented across markets and categories, largely with Torso and Tail developers. It's unclear that Android versions would deliver comparable spend benefit.

Proposal: Staff Scaled BD to close fragmented Apps content gaps

Year 1 Spend Estimate: \$27M
(Close 10% of Gap + 15% Performance handicap)

Policy = \$1.1B

- Direct = \$837M
- Scale = \$201M

Challenge: Policy Gap is highly concentrated in markets (NA, EMEA) and categories (Social, Music). There are real short term spend implications but more concerning is the long term impact on growing our active buyer base.

Proposal: Enforce policies and require use of Play Billing for Apps IAP and Subscription services

Year 1 Spend Estimate: \$165M
(15% Performance of Total)

Performance = \$2.7B

- Direct = \$1.94B
- Scale = \$640M



Challenge: Performance Gap is highly fragmented across markets, categories, and developer needs. Requires a more robust understanding of business drivers and additional BD resources.

Proposal: Direct & Scaled BD can drive growth opportunities using data-driven tools to identify highest potential opportunities (Jarvis)

Year 1 Spend Estimate: \$200M
(Increase Play Performance by 50%)

Google play

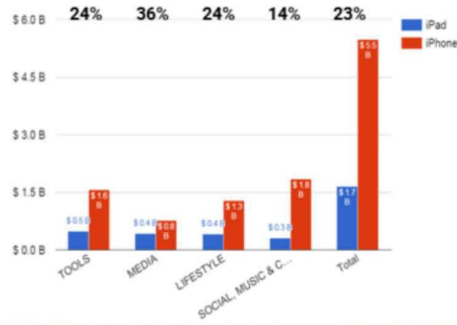
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| Id | Date | Text |
|--|---------------------|---|
| 1 | 10/26/2015 17:50:13 | Yes, they are spend #s, have updated. The slide is saying that using BD levers (and policy) that we believe \$400M is addressable in the first year. |
| 2 | 10/26/2015 17:54:19 | <p>The largest difference in how Apple treats apps (compared to how they treat games) is visibility in marketing campaigns.</p> <p>We're refreshing app categories to improve discovery, in some cases these will more closely align with Apples.</p> <p>Overall, the intent was to focus on where the apps business is today with respect to consumer spend (slides 1-10) and tee up some early ideas on BD solutions, not a comprehensive set across all functional activities. We can remove these if they are distracting for today's discussion.</p> |
| 1 | 10/26/2015 20:53:14 | I assume these numbers are spend and not revenue. Is this slide saying that of the \$6.1B gap, we believe only \$400M is addressable? |
| 1 | 10/26/2015 20:53:14 | <p>Jamie -</p> <p>I think there is a more detailed analysis we could do to see what a reasonable upside estimate is on closing the performance gap. However, it would be based on a lot of assumptions that I'm not sure we could validate until we actually start doing...rather than analyzing.</p> |
| 2 | 10/26/2015 20:54:22 | These proposals don't mention product opportunities. Does the App Store treat app categories differently than we do in Play? Does Apple do anything in its store or other parts of its UI to better promote and encourage the use of apps? |
| 2 | 10/26/2015 20:54:22 | Redbull is an obvious product initiative that could support closing performance gaps. |
| <div>   </div> | | |

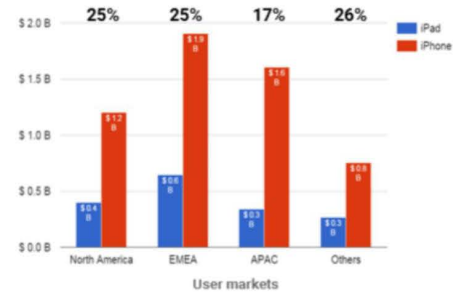
Tablet performance: iPad accounts for 25% of iOS Gap

iPad Spend is **23x** Android Tablet....but only accounts for **25%** of iOS Spend Gap

23% apps spend on iOS comes from iPad
(8% of tablet apps spend on Play comes from tablets)



EMEA and NA have 25% apps spend on iOS from iPad
Regional breakdown of tablet apps spend on Play is consistent



in 2015 140M android tablets have been sold vs 54M iPads (Source: IDC) - per unit underperformance is 60X

Google play

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| Id | Date | Text |
|---|---------------------|--|
| 3 | 10/26/2015 18:36:35 | Is there a product opportunity to make Android tablets perform better in this area? If so, what would it be? |
| 3 | 10/26/2015 18:36:35 | The gap is so large it warrants a deeper look overall. |
| <div>Google play</div> <div>Google Confidential and Proprietary</div> | | |

Summary

Current state of apps business

- Apps are underperforming by \$5.8B when compared to iOS (not including China or Apple apps)
- Project \$400M is addressable in the near term through targeted app acquisition, tighter policy enforcement, and proactive consultation
- There are some bright spots
 - Many top performers are using Play billing, we can contribute to optimizing performance
 - Apps are delivering as many buyers as games (with lower LTVs), more work to determine which markets and which categories are delivering active buyers and how to grow contribution

BD Levers

- Staff Scaled BD to close Apps content gaps
- Enforce policies and require use of Play Billing for Apps IAP and Subscription services
- Direct & Scaled BD can drive greater growth using data-driven tools to identify highest potential opportunities (Jarvis)

Google play

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Appendix

Google play

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Apps Buyers v Game Buyers

Insight: Even with this Spend gap today, almost 44% of new Play buyers come from Apps. Dominated by WhatsApp, Line & Kakao. Less than 20% buy both Apps & Games.

Hypothesis: There is untapped potential in app specific buyer retention initiatives



Google play

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Exhibit F4

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Exhibit

14

1 UNITED STATES DISTRICT COURT
2 NORTHERN DISTRICT OF CALIFORNIA
3 SAN FRANCISCO DIVISION

4 -----X
5 IN RE GOOGLE PLAY STORE
6 ANTITRUST LITIGATION
7 Case No. 3:21-md-02981-JD

8 THIS DOCUMENT RELATES TO:
9 Epic Games Inc. v. Google LLC, et al.,
10 Case No. 3:20-cv-05671-JD

11 In Re Google Play Consumer
12 Antitrust Litigation
13 Case No. 3:20-cv-05671-JD

14 In Re Google Play Developer
15 Antitrust Litigation,
16 Case No: 3:20-cv-05792-JD

17 State of Utah, et al., v.
18 Google LLC, et al.,
19 Case No: 3:21-cv-05227-JD

20 -----X

21 VIDEOTAPE DEPOSITION
22 HAL SINGER, PH.D.
23 Thursday, May 12, 2022
24 9:07 a.m. (EST)

25 Reported by:
Ryan K. Black, RPR, CLR, Notary Public

1 being reflected in the prices of apps in the
2 transaction data.

3 Q. Right. And your opinion is that
4 Google's service fees, to the extent that they
5 are supercompetitive, is equivalent to an
6 increase in the developer's marginal cost.

7 A. It can be understood that way, yes.

8 Q. Right. And in your report, you've
9 modeled the proper economic way to calculate how
10 a profit-maximizing developer would set prices
11 based on marginal costs.

12 A. I have. And --

13 Q. Right.

14 A. -- and, as you know, it depends on
15 the -- the nature of the demand and the demand
16 specification that you assume, right? Each
17 demand specification you assume is going to apply
18 at different pass-through rates.

19 Q. Right. So could you go to Page 104 of
20 your report, your opening report, please?

21 A. Sure.

22 Q. And you'll see this is a continuation of
23 the Paragraph 225 from the previous page.

24 And you've got a formula there that has
25 "P minus C star divided by P equals one divided

1 by E sub D."

2 Do you see that?

3 A. Yes. That's the classic Lerner markup.

4 Q. Right. So that's -- that's the proper
5 economic model for how a profit maximizing
6 developer would set prices based on marginal
7 costs, right?

8 A. That model describes the markup over
9 marginal cost as the function of the elasticity
10 of demand faced by the developer.

11 Q. Right. And -- and this model on Page
12 104 of your opening report, that -- that's --

13 A. So --

14 Q. -- the correct economic mod -- economic
15 way to model how the change in marginal costs
16 will affect the price that the developer charges.

17 A. It's the -- it's the way to think
18 about it at -- at a very, very high level of
19 abstraction. But, as you know, to actually
20 estimate the pass-through rate here, I have to
21 make an assumption about the demands curve and --
22 and -- and the precise nature of demand that a --
23 the developer faces, right?

24 Once you --

25 Q. Understood.

1 A. -- make a -- once you make that
2 decision, you get these pass-through rules,
3 right? And the pass-through rules -- whether you
4 go linear or logit or -- or constant elasticity
5 -- are going to express pass-through as a
6 function of things that do not include the
7 marginal cost.

8 Q. Understood. But this formula on Page
9 104 of your report is the correct economic way to
10 model the relationship between the developer's
11 price and the marginal cost in general?

12 A. Well, I just want to put that caveat in
13 there. It's the -- it's the -- definitely the
14 way to think about it and why it's in my
15 preamble, right?

16 But when I go to model the precise
17 amount of pass-through, I have to make an
18 assumption about what kind of demand the
19 developer faces, right? And that -- that puts
20 me to a -- takes me to a pass-through rule that
21 isn't necessarily going to be denominated in
22 terms of costs.

23 Q. Understood. So -- but -- but this mod
24 -- this economic model you've described in Page
25 104 of your report, that's generally accepted in

1 economics.

2 A. Yes.

3 Q. Now, if you just look at the cost term
4 there, C star, and the -- the C star in that
5 formula that you have on Page 104 of your report
6 is equal to C divided by one minus T, right?

7 A. Correct.

8 Q. And -- and in that -- in that cost term
9 I just described, T is the service fee rate?

10 A. Correct.

11 Q. And C is the developer's per-unit
12 marginal cost other than the service fee?

13 A. Correct. Processing and the like, yes.
14 Any other --

15 Q. Okay.

16 A. Any other types of marginal costs.

17 Q. Okay. And so one input into the
18 generally accepted economic model of how the
19 profit-maximizing developer would set pri --
20 prices is the marginal costs other than the
21 service fee.

22 A. For short-run profit maximization, the
23 answer is, yes, that this model, at this high
24 level of ab -- of abstraction, is a function of
25 the marginal cost.

1 Q. Right. And in terms of how the price is
2 a function of mar -- of --of -- of marginal cost,
3 the -- the -- the formula you've got here on Page
4 104, in that formula, the effect of a change in
5 the service fee -- let me -- let me put it
6 differently.

7 The formula you've got on Page 104, the
8 effect on prices will be -- as a result of a
9 change in the service fee will be proportional to
10 the marginal costs other than the service fee.

11 A. In -- for short-run profit maximization,
12 yes. For -- for long-run profit maximization,
13 this is not -- this is not the -- the way that
14 you'd get to the effect on price.

15 Q. Okay. Now, -- so let me just ask,
16 looking at this cost term here, C -- C star, if C
17 in that formula, which is the marginal cost other
18 than the service fee, if that's zero, then the
19 service fee rate will not have any effect on the
20 ultimate price charged according to this model,
21 correct?

22 A. Let me just say this: It -- it's --
23 it's never zero in the real world. But -- but if
24 you want me to ask -- answer the hypothetical,
25 counterfactually, if we had -- if we had a zero

1 marginal cost, then by this model, and this model
2 alone, then in the short run, prices would not
3 adjust to the take rate.

4 As I explain in my report, there's all
5 sorts of reasons why we would still, even in that
6 extreme and counterfactual assumption, would
7 expect prices to change with the change in the
8 take rate, including from steering, including
9 from having to cover all costs in the long
10 run, --

11 Q. Okay.

12 A. -- including from sticky prices.

13 Q. Okay. Now, let me just ask again,
14 hypothetically, if that term C, which are the
15 marginal costs other than the service fee rate
16 in your formula on Page 104, if that term is
17 negative, then a reduction in the service fee
18 rate will actually lead to an increase in the
19 price that the developer would charge.

20 A. I haven't done that one yet, but I
21 think you've got the -- the sign correct. If you
22 multiply, in that example, 1.43 by a negative
23 cost, I think that there -- there would be a
24 negative relationship in the short run for this
25 equation.

1 they would land on Microsoft's productivity
2 package would be higher than if they were to land
3 on some obscure package within productivity apps.
4 I mean, it's -- it's very intuitive. It's very
5 natural.

6 Q. Now, your pass-through formula is based
7 on logit demand.

8 A. Yes.

9 Q. And one feature of logit demand is that
10 all goods in the market where demand is being
11 measured are substitutes.

12 A. I think that's a general -- that is
13 generally the case. That's fine.

14 Q. Okay. Is it your opinion that all apps
15 in each Google Play app category are substitutes?

16 A. No. And that's why I invoked this
17 concept of cluster markets. Like, you could --
18 you could take Microsoft's Excel and Microsoft's
19 Word and ask me if they're substitutes, and I
20 would say at -- at that level, they're not.
21 But -- but when you think about the fact that
22 Microsoft and Google are actually competing with
23 a package of productivity apps, that -- that it
24 would make sense to think of that as something
25 more akin to a cluster market the way that we saw

1 in the Staples and Office Depot case, that paper
2 clips and a ruler aren't necessarily substitutes;
3 but if the people generally tend to buy those
4 things from the same place, they can belong in
5 the same product market.

6 Q. So -- but -- but it's not your opinion
7 that all apps in each Google Play app category
8 are substitutes.

9 A. I just gave an example of Excel and Word
10 as being more -- more of complements, right? But
11 -- but when you think about the -- the cat -- the
12 productivity suite that Google is offering, that
13 -- that's clearly a substitute to what -- what
14 Microsoft is offering in its productivity suite.

15 Q. Right. So some of the apps in each
16 Google Play category could be complements,
17 correct?

18 A. They could be.

19 Q. And some could be substitutes.

20 A. They could be, yes.

21 Q. Right. And you haven't put forth a
22 model in your report to determine which apps in
23 each category are complements and which are
24 substitutes?

25 A. No. And it's not necessary to get the

1 implied pass-through rate.

2 Q. Right.

3 Could you go to Paragraph 78 of your
4 reply report -- well, actually, let me ask you:
5 Are you opining that all apps in each category
6 are part of a cluster market?

7 A. No. You -- you saw in my report. I'm
8 saying that they don't need to necessarily be a
9 market, a relevant market, for antitrust
10 purposes, and I give you a citation for that.

11 I think that if you -- if you really
12 wanted to -- if you forced it into that box,
13 which is unnecessary and unnatural, that you
14 could -- you could get there by -- by
15 understanding the categories functioning
16 more like a cluster market.

17 Q. Right. But you're not actually offering
18 the opinion that all of the apps in each category
19 are part of a cluster market.

20 A. No. I -- I'm offering the opinion that
21 -- that everything within the category -- that
22 the category definitions from Google define the
23 -- the contours or the arena of competition among
24 apps in that category.

25 Q. Okay. And, again, let's go to Paragraph

1 MR. RAPHAEL: He's here to answer my
2 questions.

3 MS. GIULIANELLI: Okay. Please don't
4 raise your voice at me. I would like the witness
5 to have an opportunity to answer the question.

6 MR. RAPHAEL: I'm not going to sit here
7 and have the witness tell me that my questions
8 are not good questions. I want the witness to
9 answer my questions. So I'm going to ask the
10 question again.

11 BY MR. RAPHAEL:

12 Q Is it your opinion that in the but-for
13 world that you posit in your report that all
14 developers would participate in the play points
15 program?

16 MS. GIULIANELLI: Objection.

17 THE WITNESS: The question confuses me
18 because a subsidy, an enhanced subsidy to
19 consumers, is about whether consumers will redeem
20 the points. Now, if you're asking me if there's
21 an added requirement that Google says that you
22 cannot -- the developer can't accept the subsidy
23 unless you sign a form with Google, right, the
24 developer would be -- would be crazy not to.
25 This is real money. It's just being paid for by

1 Google.

2 BY MR. RAPHAEL:

3 Q. So the answer to my question is yes, all
4 developers would participate in the play points
5 program in the but-for world?

6 MS. GIULIANELLI: Objection.

7 THE WITNESS: I -- I like the way that I
8 said it better, which is that if a developer
9 thought that a substantial percentage of its
10 customers were going to be redeeming points via
11 this new and improved program, and if Google made
12 some kind of requirement that said you have to
13 sign a piece of paper so that you can accept the
14 payments under this program, the developers would
15 do it.

16 BY MR. RAPHAEL:

17 Q. Do you know if Google has that
18 requirement in the actual world?

19 A. I don't know if the Google has the
20 requirement in the actual world.

21 Q. Would that change your opinion as to
22 what would happen in the but-for world?

23 A. No. Because the program, for all intent
24 and purposes, is [REDACTED] right now.

25 Google doesn't need to be generous with its

1 points program because Google is immunized from
2 competition. Now, I think it would be
3 considering to look at career where Google was
4 forced because of one store to increase its
5 subsidy to around █ percent and all of a sudden
6 that's starting to approach something real. You
7 know █ percent is not real. █ percent
8 actually might make a difference on purchase, and
9 I'll just leave it at that.

10 Q. What's your standard for the percentage
11 of cash back accounted for by play points that
12 would make a difference to competition?

13 A. Not about difference to competition.
14 It's what would be sufficiently generous such
15 that consumers would partake in the program.

16 Q. And what amount of a cash back would be
17 sufficiently generous that consumers would
18 partake in the play points program?

19 A. Well, when you think about, like, AMEX
20 customers partaking in their points that American
21 Express gives back, I think AMEX is more generous
22 than █ percent. In fact, Williams has the --
23 the percentage that AMEX shares with its -- with
24 its customers. It's over 1 percent.

25 So, you know, I don't know exactly the

1 A. I think the model is. I think that at █
2 percent, the economic intuition -- well, this is
3 the intuition that I'm drawing from the model --
4 is that when the benefit gets so large, that is
5 going to spur participation and usage in the
6 system.

7 Q. Great.

8 Your -- your testimony here today, sir,
9 is that you have a model in your reports that can
10 tell the Court and the jury in this case which of
11 the members of the putative class would have
12 signed up for play points and who would have used
13 them?

14 MS. GIULIANELLI: Objection to the form.

15 THE WITNESS: I didn't say that. I said
16 that if the but-for subsidy were to rise to █
17 percent, then it would be embraced -- the play
18 points system would be embraced across the class
19 just as the way that the points system in the
20 AMEX marketplace is embraced across American
21 Express users.

22 BY MR. RAPHAEL:

23 Q. Okay. So I want to -- I want to be
24 clear. You have -- your testimony is that in the
25 but-for world, every member of the putative class

1 would sign up for the play points program and use
2 their play points?

3 MS. GIULIANELLI: Objection.

4 THE WITNESS: I cannot -- this is the
5 first time I've been asked that question. I'm
6 just hearing it afresh, right? I cannot fathom
7 why a user would say, no, take back -- I was
8 going to spend a hundred dollars and I realize
9 you're trying to give me \$█, but, no, I don't
10 want the \$█, I want to spend the full hundred
11 myself. It would be crazy -- it would be crazy
12 to -- to do that.

13 BY MR. RAPHAEL:

14 Q. Sir, in the actual world, some consumers
15 don't sign up for play points or don't use the
16 play points that they earn, correct?

17 A. We've established, I hope, that when you
18 get two cents back on a hundred dollar purchase,
19 I'd say to myself I'm a busy dude, I don't know
20 if I'm going to sign up for this thing and go
21 through the hassle for the █ subsidy.

22 Q. Right. And so your testimony is that if
23 Google changed the play points rate that you've
24 put in your report, that every member of the
25 putative class would have signed up for the play

1 points program and used play points?

2 MS. GIULIANELLI: Objection.

3 THE WITNESS: I think -- I think it's a
4 fair assumption. Like, the model certainly is
5 not calling on this, but I think it's a fair
6 assumption that once it goes up to █ percent that
7 -- that everyone who is making purchases would
8 -- would either redeem it or at least enroll so
9 as to be able -- to be capable of taking the
10 subsidy at -- at those terms.

11 BY MR. RAPHAEL:

12 Q. That's an assumption, though, that
13 you're making. It's not what the model tells
14 you?

15 A. Well, the model spits out, just to be
16 clear, what the average subsidy is across all
17 users.

18 Q. Now, you -- would you agree with me that
19 the counterfactual experiment lies at the heart
20 of antitrust analysis?

21 A. Sure. I mean, it's an important thing.
22 It's -- I don't know if it's at the heart, but
23 you need -- you need to have a counterfactual.
24 You need to model the counterfactual.

25 Q. Could you describe for me the

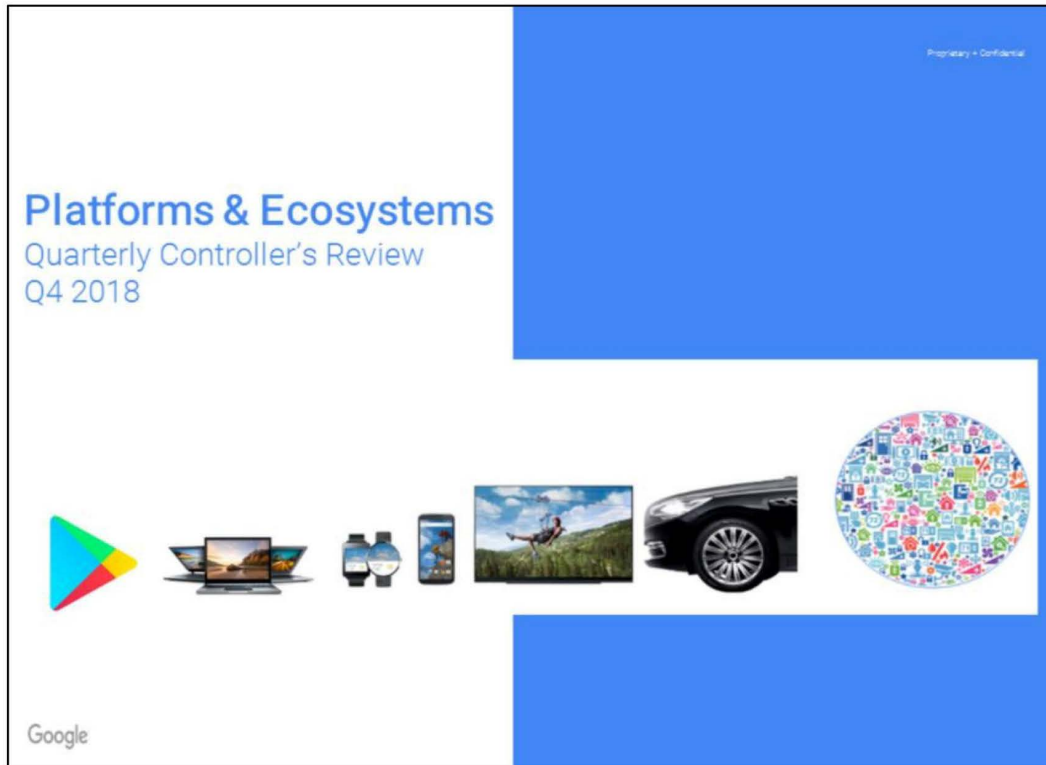
Exhibit F5

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Exhibit

20



Executive Summary

Revenue Performance in FY 2018

- Expecting revenue \$ [REDACTED]
- [REDACTED]

Play Balance Sheet

- DSO and AR aging metrics are **green** for Carriers and Gift Card Integrators. Developers paid on time.

SOX Update

- Impacted by Google-wide processes. 1 deficiency in Cash In Transit.

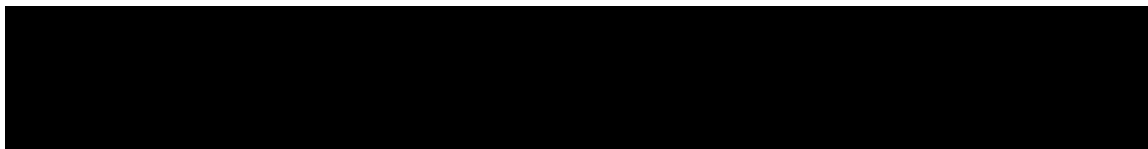
Deals, Regulatory Updates

- Android - European Commission remedy
- Play - Loyalty program

Team Org Changes

Google

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Financial Performance Update:

- P&E P&L FY2018
- Play Revenue Performance
- Android Partner Financials

Google

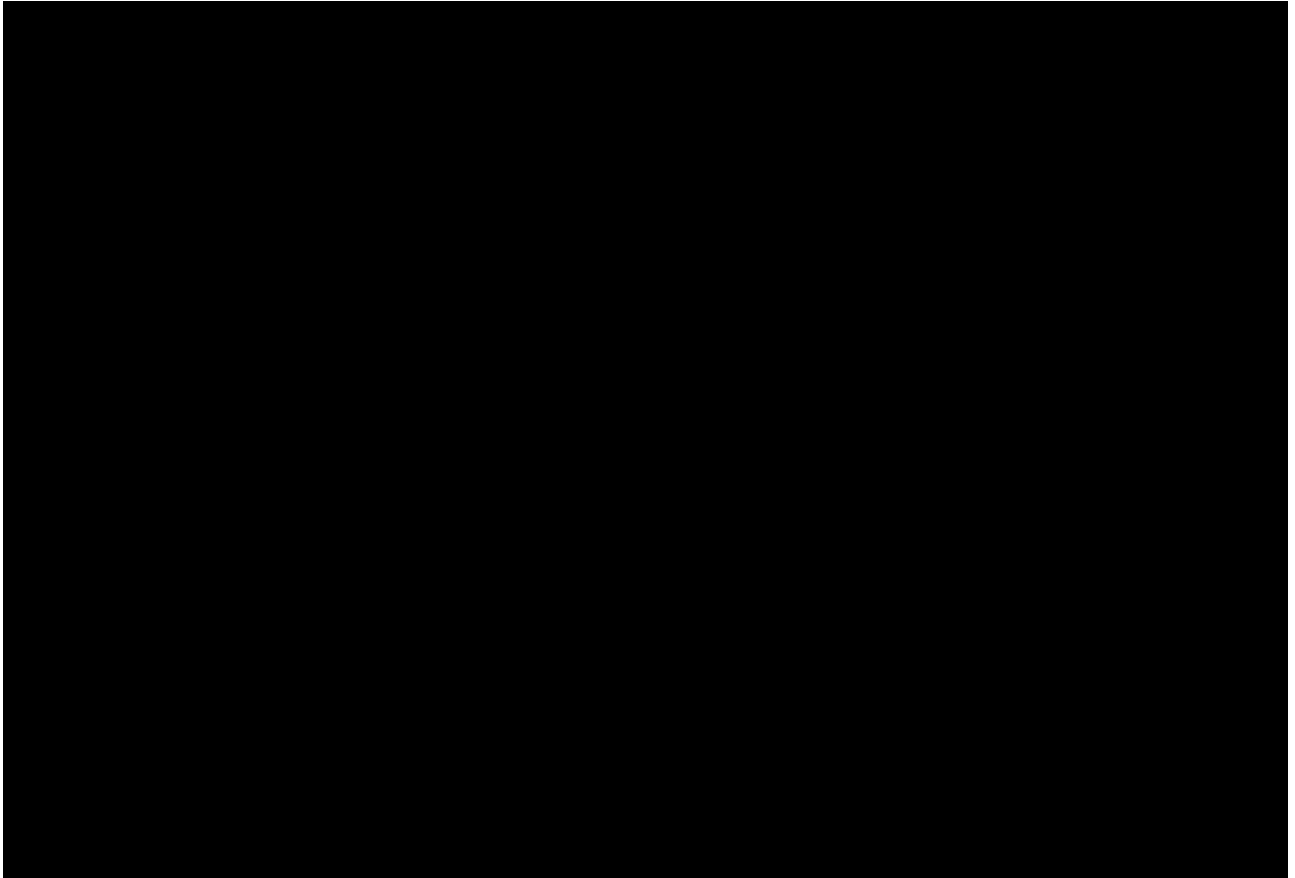
Confidential - Proprietary

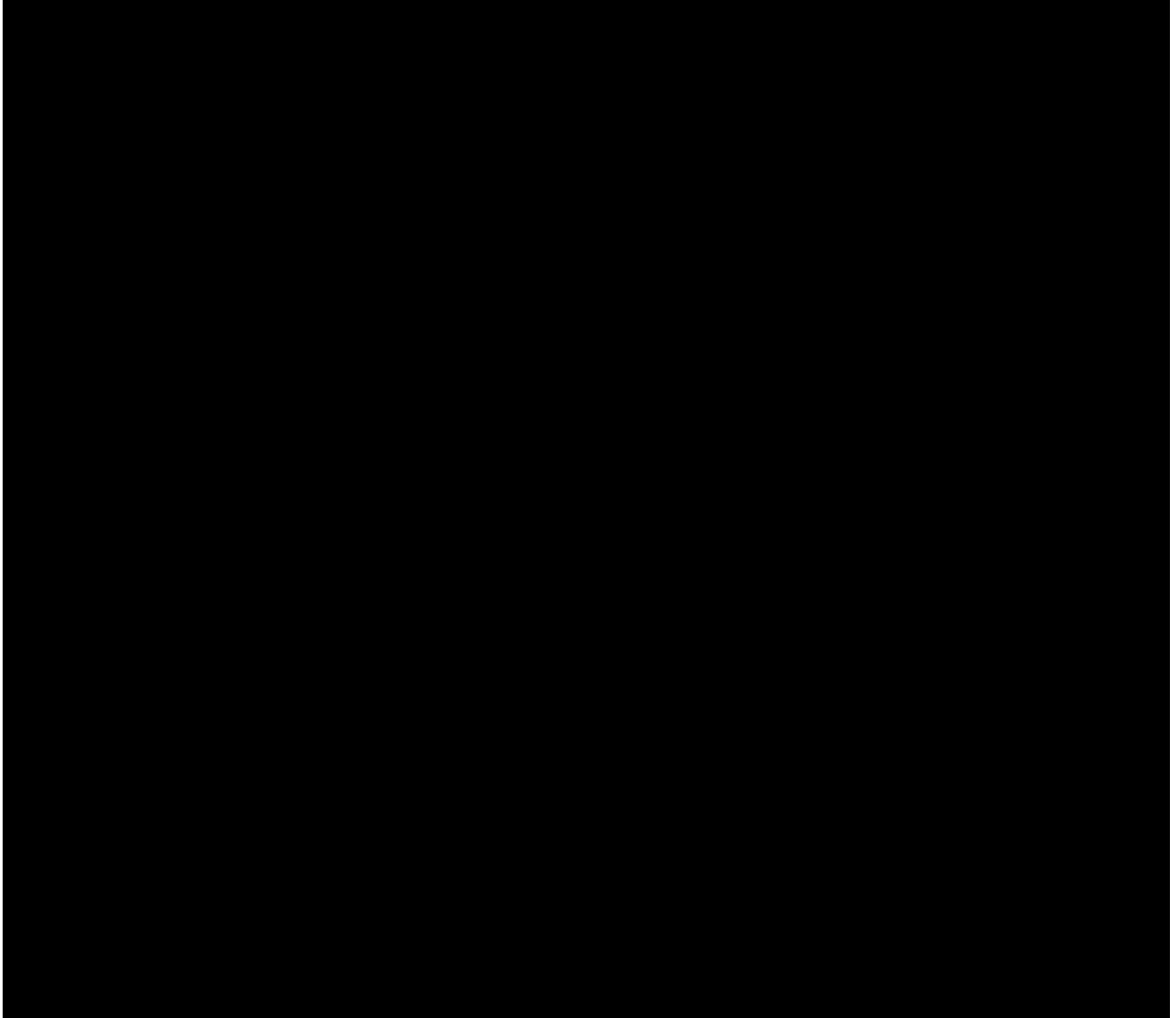
Overall operating margin essentially flat to last forecast: \$ [REDACTED] excluding F/X and EC

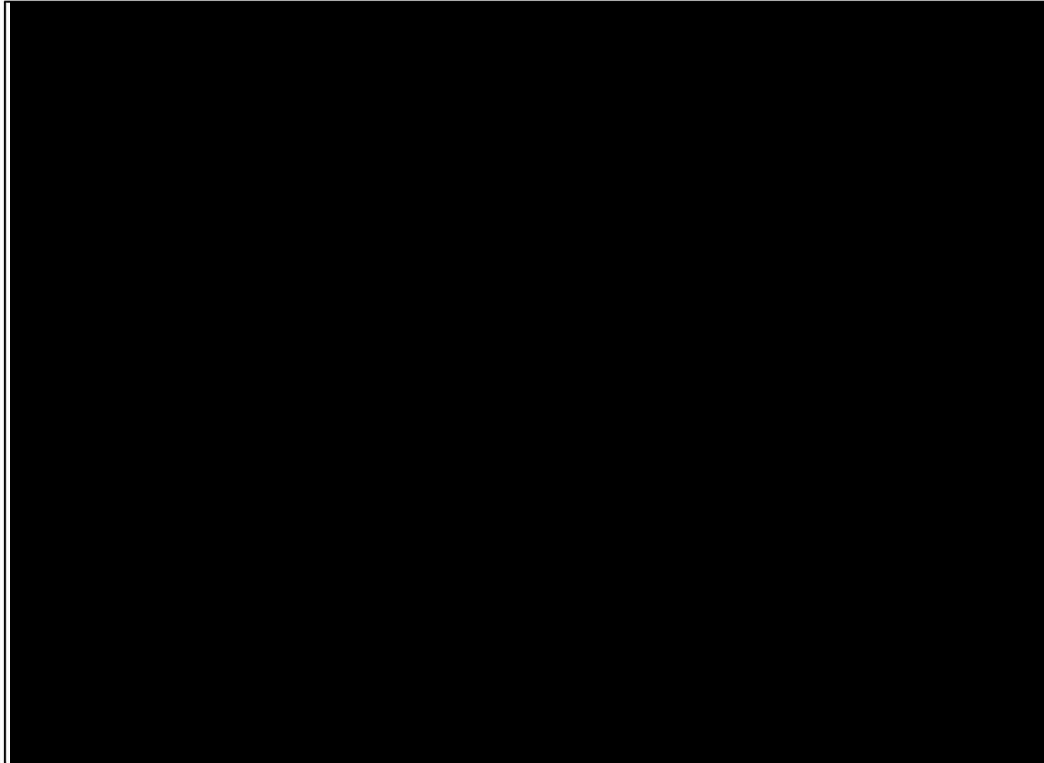
| millions, USD | Outlook | Plan | FvB | FoF |
|-------------------------------|------------|------|-----|-----|
| Net Revenue | [REDACTED] | | | |
| Core Perf. in Fixed FX | | | | |
| Other/ Contra Revenue | | | | |
| FX adjustments | | | | |
| Direct COS | | | | |
| Core Perf. in Fixed FX | | | | |
| Other | | | | |
| FX adjustments | | | | |
| Infrastructure | | | | |
| GROSS PROFIT | | | | |
| Gross profit % | | | | |
| TOTAL OPEX | | | | |
| P&E Direct OpEx | | | | |
| Payroll & SBC | | | | |
| Non-Payroll | | | | |
| Other EngPM | | | | |
| Marketing A&P | | | | |
| Sales & Marketing Allocations | | | | |
| G&A Allocations | | | | |
| TI Allocations | | | | |
| OPERATING PROFIT | | | | |
| Operating profit (excl. FX) | | | | |
| OP (excl. FX & EC fine) | | | | |

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[REDACTED]

[REDACTED]

[REDACTED]

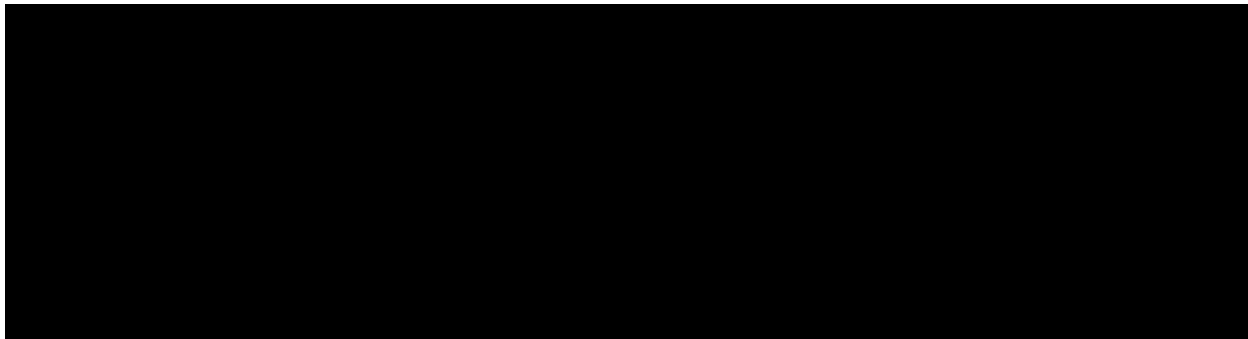
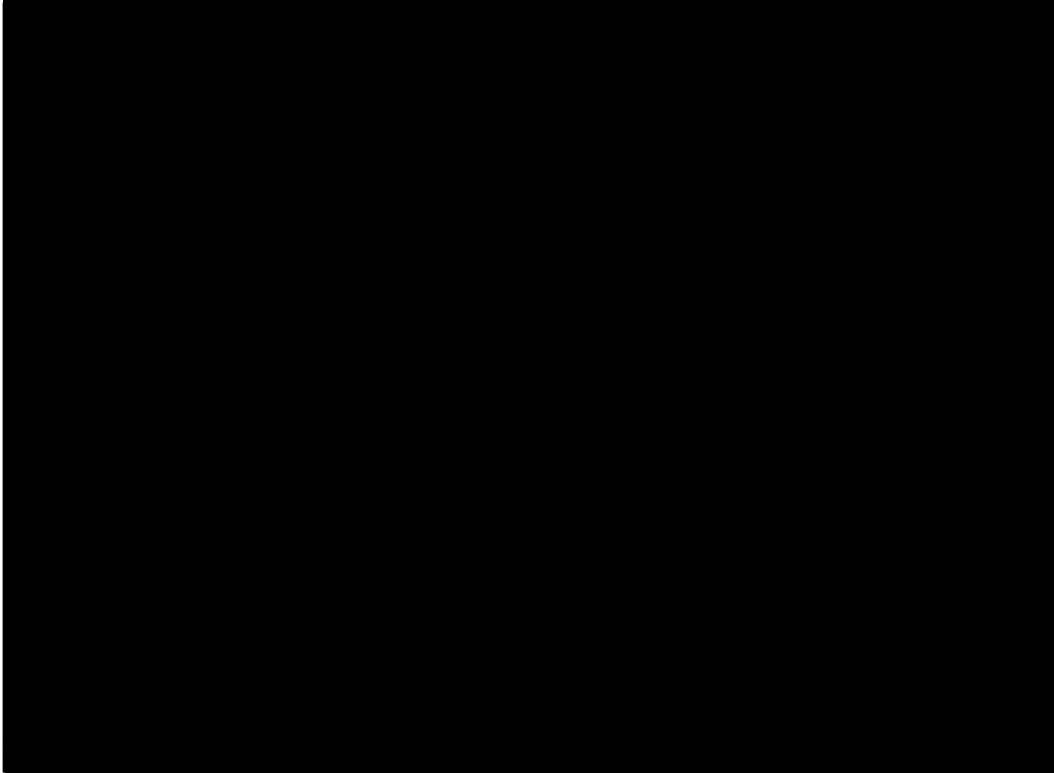
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Q4 Play Key Balance Sheet Accounts Review

November 2018 (mid quarter review)

Google

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Play: Key Accounts Receivable

Mid Q4 review: Carriers & Gift Card Integrators are in good standing.

DCB Accounts Receivable

| DCB AR | AR (\$'M) | | | | +60days (Oct) | DSO | |
|--------|-----------|--------|--------|-----|------------------|--------|-----|
| | Aug-18 | Sep-18 | Oct-18 | MoM | | Oct-18 | MoM |
| Global | | | | | | | |
| JAPAC | | | | | | | |
| NA | | | | | | | |
| EMEA | | | | | | | |
| LATAM | | | | | | | |

Gift Cards Receivable

| Gift Card | AR (\$'M) | | | | +60days (Oct) | DSO | |
|-----------|-----------|--------|--------|-----|------------------|--------|-----|
| | Aug-18 | Sep-18 | Oct-18 | MoM | | Oct-18 | MoM |
| Global | | | | | | | |
| BHN | | | | | | | |
| ePay | | | | | | | |
| InComm | | | | | | | |

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- EMEA 60+ impacted by summer holidays.
- NA 60+ affected by [REDACTED]. Escalated the BD on the 31st of August, promise of payment received.
- JAPAC big carrier are performing well, most of late payment have been resolved.
- Gift Cards - Settlement files are received weekly and have 30 days terms

Play: Key Accounts Payable

Q4 review: Developers paid on time. [REDACTED] Abandon Property Opportunity

| Developer Payables | | | | | | | |
|--------------------|--------|----------|----------|----------|----------|----------|----------|
| DPO Commerce | Target | May 2018 | Jun 2018 | Jul 2018 | Aug 2018 | Sep 2018 | Oct 2018 |
| Global | | | | | | | |

| Aging Commerce | May 2018 | Jun 2018 | Jul 2018 | Aug 2018 | Sep 2018 | Oct 2018 |
|----------------|----------|----------|----------|----------|----------|----------|
| <30 Days | | | | | | |
| 30-90 Days | | | | | | |
| 90 Days+ | | | | | | |
| Total | | | | | | |

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Opportunity to take AUP >3 years outside the US to income.

Q4 Strategic Deals, Reg Updates:

- Becker Update
- Play - Loyalty Program

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Becker Update

EC Android Compliance | Dec 16

Contracts and Partner Setup through Dec 18th:

- Top partners: Samsung and Huawei - in progress, following discussion at the Hong Kong summit last week.
- 479 agreements (EMADA, Placement, Search/Chrome license, Go) fully executed with 190 in progress.
- Billing set up is complete for 13 partners with 188 remaining.

Infrastructure readiness: Monetizer ready. Payments code complete. E2E (Sandbox & Prod) testing in progress; data granularity fixes underway. UAT testing in progress. Bounty statements & invoice details - design in progress.

TAC impact of Project Becker in the European Economic Area during the fee holiday period (Nov'18-Jan'19):

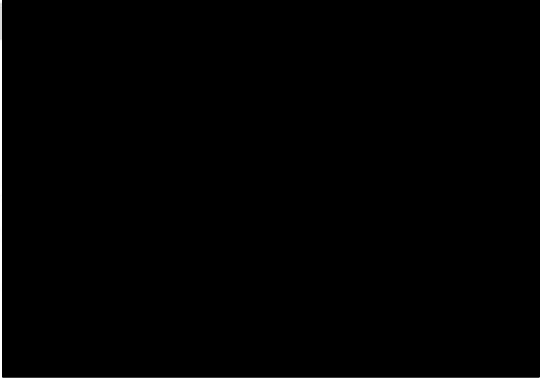
- Estimate: ~\$0.05M-\$0.1M in Q4'18 and ~\$19M-\$27M in Jan'19
- Top OEMs have yet to sign EMADA, only three smaller partners have had some activations

PRIVILEGED & CONFIDENTIAL // REFLECTS EU OC ADVICE IN ONGOING COMPETITION MATTER

Google

Loyalty Points: Japan launched in Sept 2018, targeting KR, US in 2019
Objective: Improve HVU retention by deepening our relationships w/users via rewards platform

HVU spend coverage achieved earlier than expected due to rapid enrollment



- [REDACTED] % in Japan consumer spend flows through Loyalty Program (as of Dec 6) with [REDACTED] enrolled members. Achieved 1 year forecasted spend coverage of [REDACTED] %.
- Revenue uplift and HVU churn reduction will be analyzed in Jan, targeting [REDACTED] of revenue uplift in Q4 2018.
- [REDACTED]
- No noticeable differences between IFRS and US GAAP

*Spend from Dune. Total consumer spend is directional due to Dune Orders [REDACTED]. % of total spend under Loyalty is accurate

Play Points is an important way we can engage and reward some of our most active Play store users (

1 point=1 c. Points liability will be relieved upon usage or expiration, whichever occurs first. Points liability could range from [REDACTED] ([REDACTED] % of total points issued) as we expect most buyers to use spend their points within [REDACTED]

Source:

<https://docs.google.com/spreadsheets/d/16zKBahbCERT6fDwv17W0labteQ612WXpmswhiNq0o2Q/edit#gid=0>

[REDACTED]

SOX Update

Google

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2018 SOX Update

Play control environment impacted by control deficiencies in Google-wide processes.
Ending year with 1 control deficiency with CIT. Credit Cards process is under evaluation.

SOX Controls open issues:

- Credit Cards process design - still under evaluation. Booked \$24M in under accrued credit card fees in Q4.
- Cash in Transit system design issue in B3 impacting multiple products areas.

SOX Resources: hired, staffed for 2019

- 2 FTE granted (1 by Business, 1 by Finance) and hired. 1 started in November, 1 start in January.

14

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Remediated, closed:

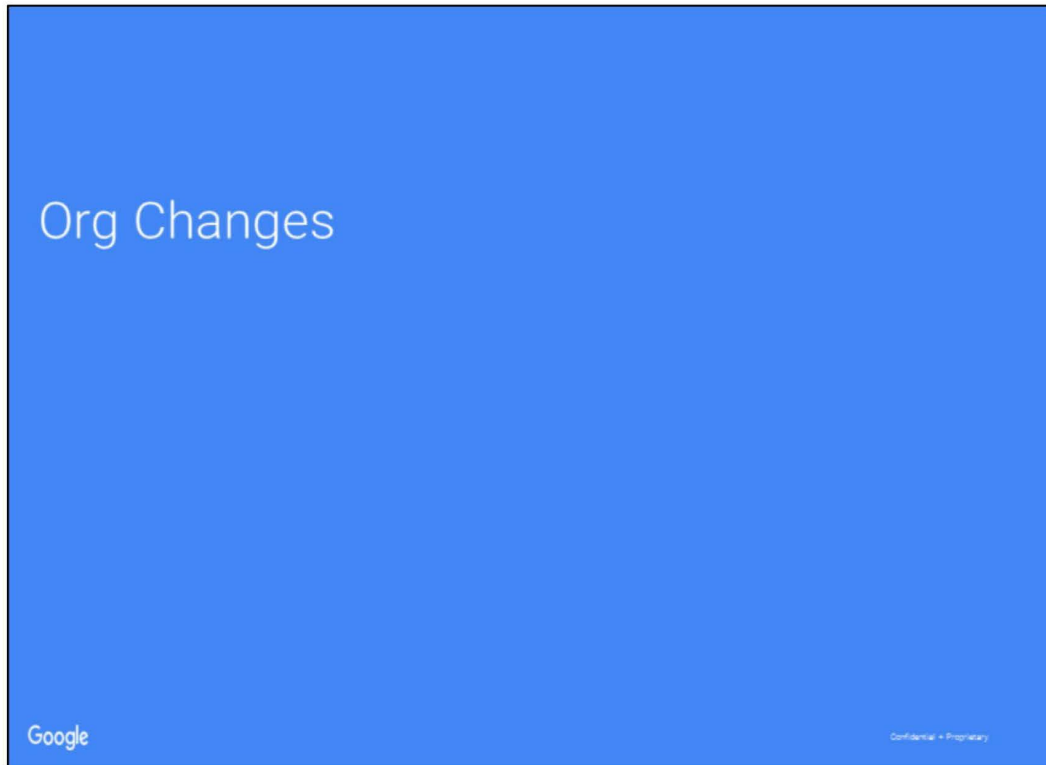
Deficiency identified (fully remediated as of year end - memo) in the Play OTC process, where orders were charged without delivering to the user. < 6 Million USD impact in one sided user refunds.

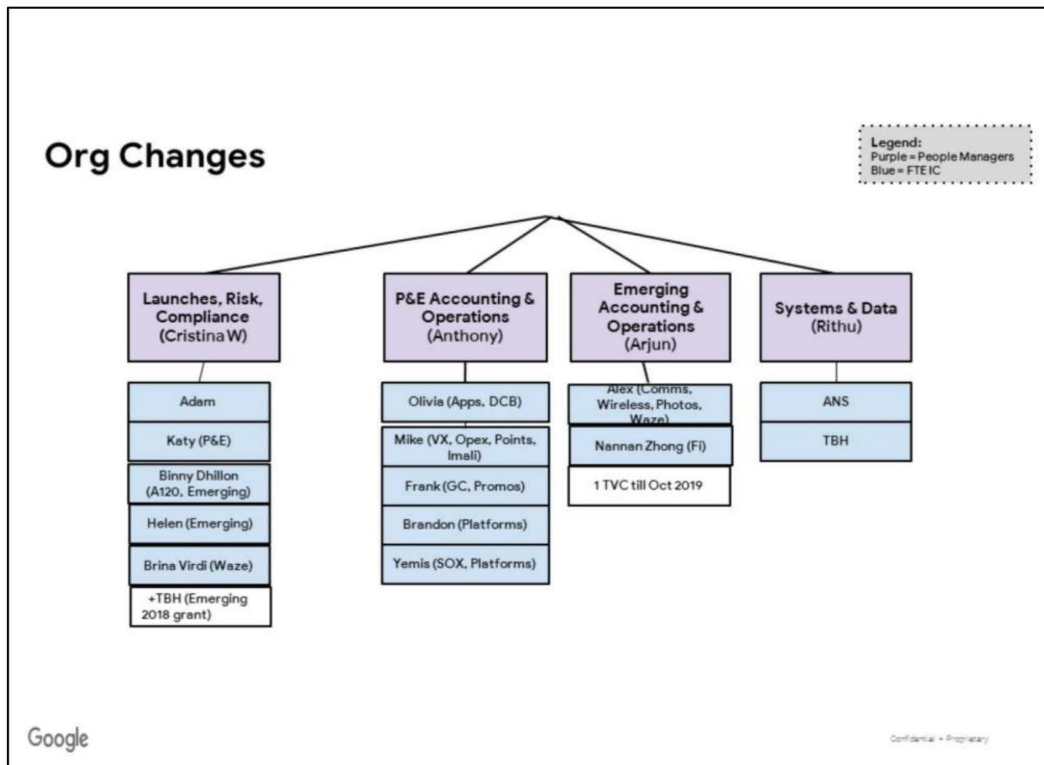
Q2 Geo Disclosure Reporting error:

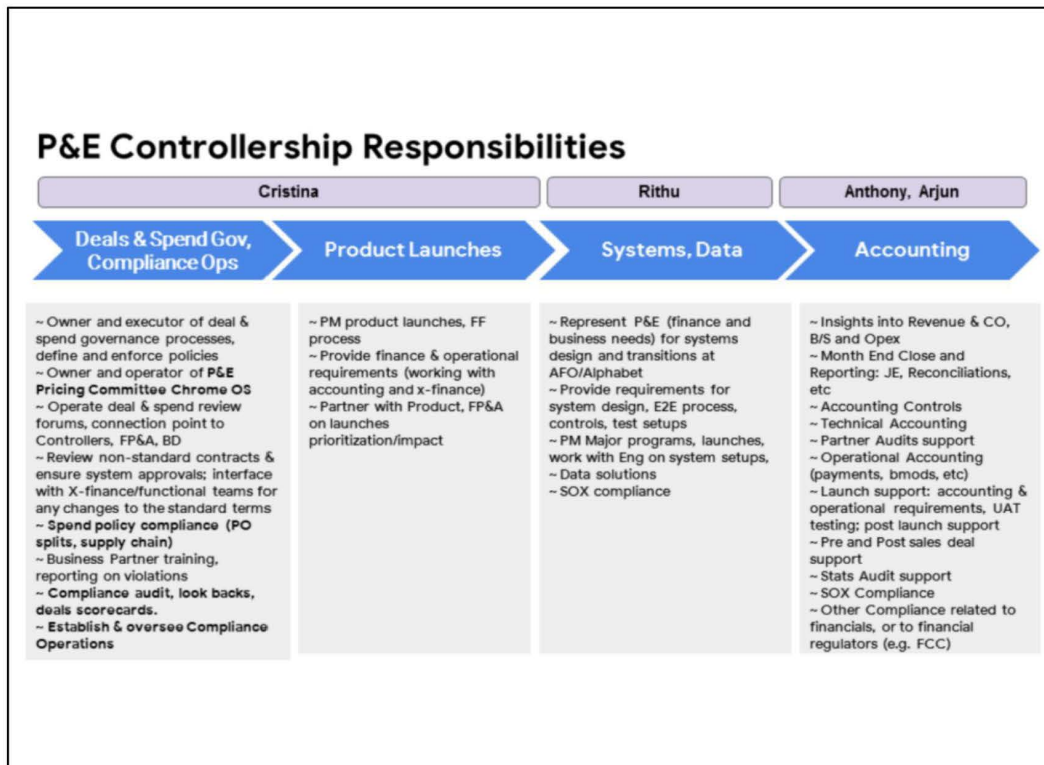
Play Apps revenue was coded to the buyer location for Merchant of Record (MoR) transactions instead of the seller location which caused data discrepancies in the Revenue by Geo disclosure in our 10Q in Q2, 2018.

Payments Engineering supporting an intermediary reporting fix for Q1 2019. Validation in-progress.

Play Controllershship team has build an interim solution to support geo reporting from alternate SOX compliant source in the interim (Q4). Solution vetted with key stakeholders. Post Mortem







Appendices

- 2018 & Q4'18 Play Revenue vs Plan
- 2018 P&E Launches Overview
- P&E Nov Close Deck ([Play](#), [Platforms](#))

Google

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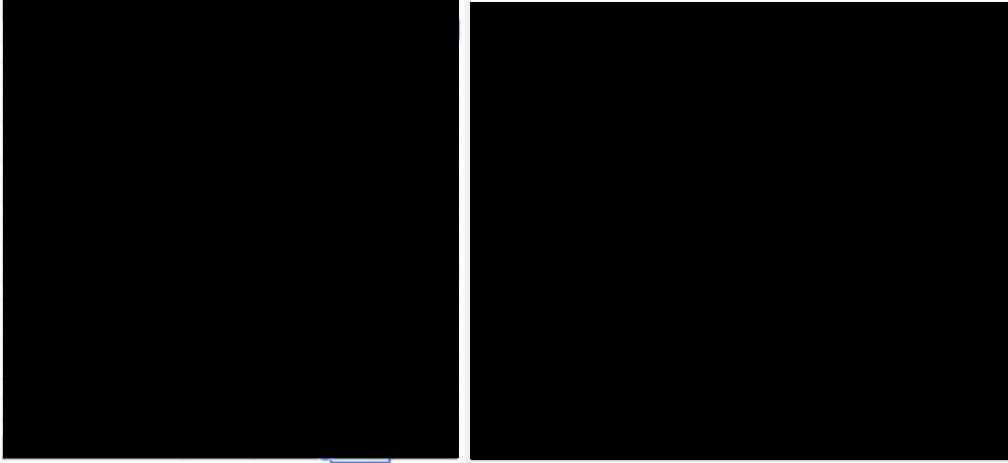
Full year forecast and variance to budget by PA

| | Platforms | | | | Play | | | |
|--------------------------------|-----------|---------|----------|----------|---------|--------|---------|------|
| | Outlook | FvB | Outlook | FvB | Outlook | FvB | Outlook | FvB |
| millions, USD | Android | Android | ChromeOS | ChromeOS | Chrome | Chrome | Play | Play |
| Net Revenue | | | | | | | | |
| Core Perf. Revenue in Fixed FX | | | | | | | | |
| Other/ Contra Revenue | | | | | | | | |
| FX adjustments | | | | | | | | |
| Direct COS | | | | | | | | |
| Core Perf. Revenue in Fixed FX | | | | | | | | |
| Other | | | | | | | | |
| FX adjustments | | | | | | | | |
| Infrastructure | | | | | | | | |
| GROSS PROFIT | | | | | | | | |
| TOTAL OPEX | | | | | | | | |
| Direct OpEx | | | | | | | | |
| Payroll & SBC | | | | | | | | |
| Non-Payroll | | | | | | | | |
| Other EngPM | | | | | | | | |
| Consumer Marketing A&P | | | | | | | | |
| Sales & Marketing Allocations | | | | | | | | |
| G&A Allocations | | | | | | | | |
| TI Allocations | | | | | | | | |
| OPERATING PROFIT | | | | | | | | |
| OP % | | | | | | | | |

Google

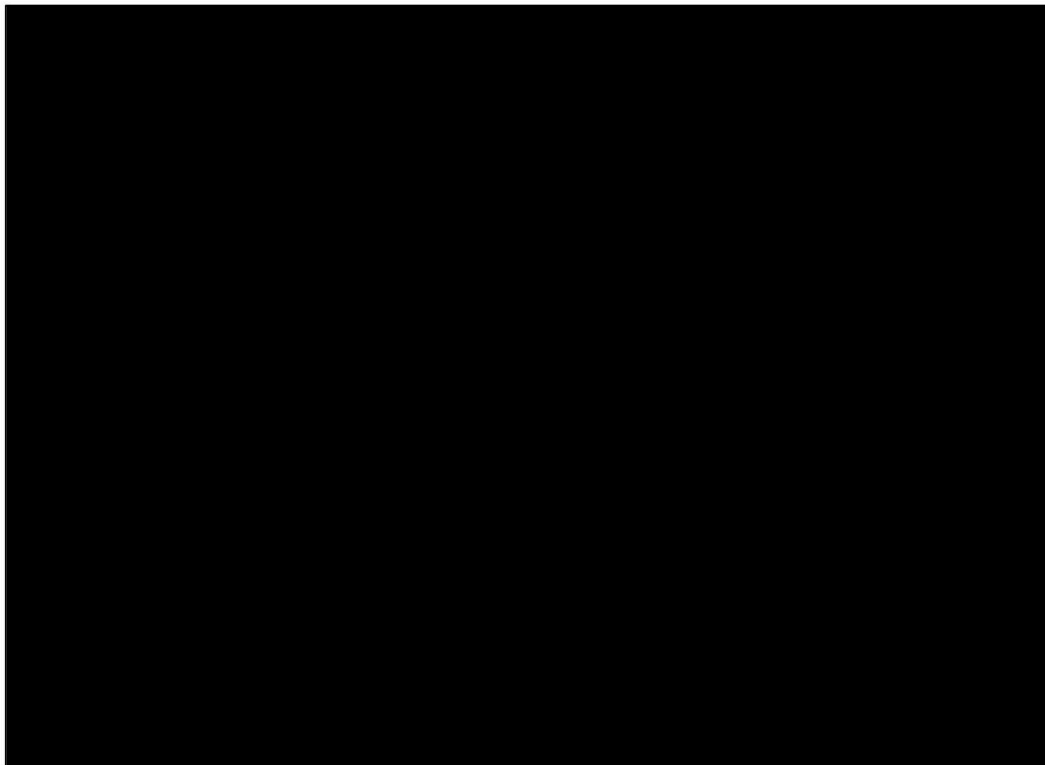
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4Q P&E P&L: Expected to land ahead of target



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Speaker notes:

<https://docs.google.com/document/d/1ACcAGHjPF8hEZq5mttQvQX5BdSi18IMzBxzgotUC7YQ/edit?hl=en>

Did you know:

[REDACTED]

Tinder - #1 Grossing title by spend in 16 countries (incl. GB, CA, IN)

[REDACTED]

LiveOps - Over 100 LiveOps spotlights with 75 expected in Q2 (+76% vs Q1); 370+ LiveOps Card events surfaced for 36 developers; \$30M+ estimated consumer spend uplift for H1 titles, +4% avg engagement uplift, ~20% avg featuring impact

Spring deal promotion - Ran successful Spring Deals promotion [REDACTED]

[REDACTED]

Proprietary + Confidential

Loyalty Points: Japan launched in Sept 2018, targeting KR, US in 2019

Objective: Improve HVU retention by deepening our relationships w/users via rewards platform



Google Play Points

HVU

| | | | | |
|------------------------------------|---------------|---------------|-----------------|----------------|
| | | | | |
| Bronze | Silver | Gold | Platinum | Diamond |
| ブロンズ | シルバー | ゴールド | プラチナ | ダイヤモンド |
| Up to \$181 | \$181-\$617 | \$618-\$2,000 | \$2,001-\$6,099 | \$6,100+ |
| <small>(Spend required/yr)</small> | | | | |

Program Goals

- Cultivate a direct relationship with users, primarily targeting HVUs to reduce churn
- Provide a point of differentiation vs. AMZN (& iOS)
- Enhance developer partnerships



Google

Accounting & Operational Considerations: Points program will have both P&L and balance sheet impacts

1. Points are considered a material right to the end user for accounting purposes, which generates a performance obligation from Google to the user for future purchases and requires revenue deferral for purchases
2. Program will require the recognition of a points liability on the balance sheet (not deferred revenue) for the relative fair value of loyalty points based on the initial sale transaction
3. Points liability will be relieved upon usage or expiration, whichever occurs first. Points liability could range from [REDACTED] [REDACTED] % of total points issued) as we expect most buyers to use spend their points within 2 months
4. Accounting will be manual initially, based on the system reporting. Need to have enough historical data to build the model for automation.

*On apps and games, slight margin difference exist for digital content

Google

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- When points are spent, a portion of the deferred revenue release must be allocated to Revenue and/or Contra Revenue based on what the end user purchases.
- A&G point spend = Revenue + Contra Revenue (developer payout in excess of standard ~70% rev share)
- VX point spend = Revenue
- A material right is an option for free or discounted future goods & services that the customer would not receive without entering into the contract. In effect, the customer pays the entity in advance for future goods or services, and the entity recognizes revenue when those future goods or services are transferred or when the option expires.
- Over time, for every 100 points (\$1 value) earned and spent*, Google forgoes \$ [REDACTED] in margin.
- We expect that for a single country, the liability at the end of year 1 could range from \$ [REDACTED] to \$ [REDACTED]. Similar to monetary promos, we expect users to spend their points fairly quickly, so at the end of the year, unspent points could range from [REDACTED] % of total points earned during the year (\$ [REDACTED] total points earned in year 1).

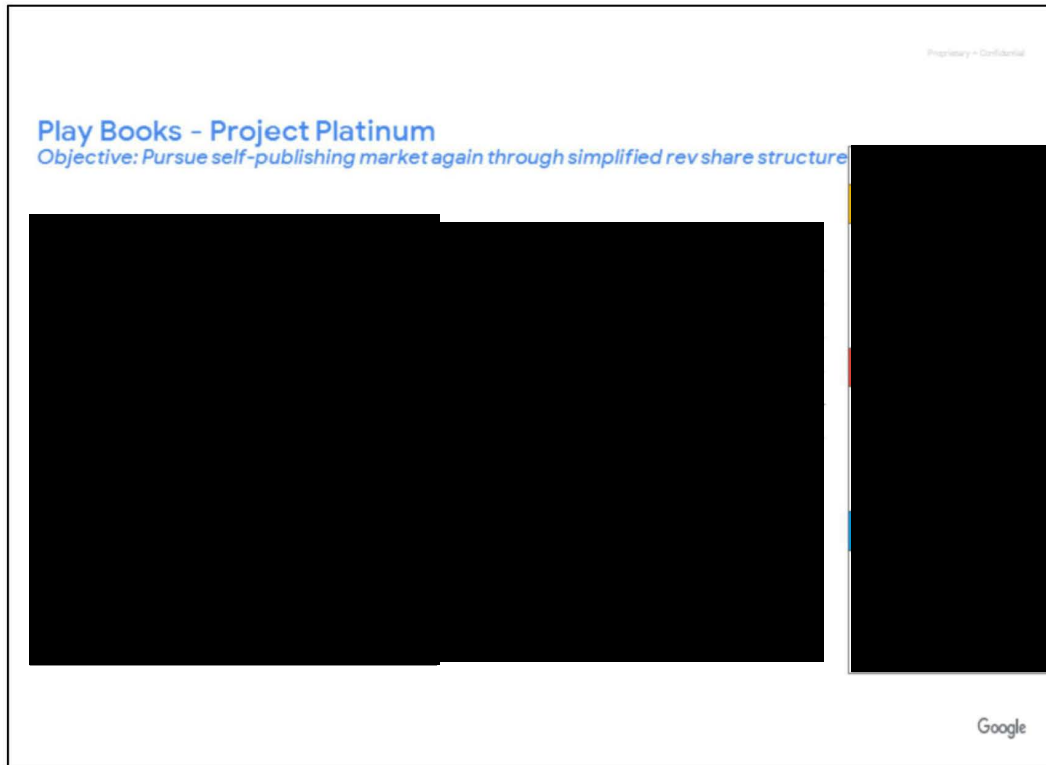


Exhibit F8

Public Redacted Version

FILED UNDER SEAL

Exhibit 19